TECHNISCHE HOGESCHOOL DELFT
AFDELING DER SCHEEPSBOUW- EN SCHEEPVAARTKUNDE
LABORATORIUM VOOR SCHEEPSHYDROMECHANICA

RESISTANCE TESTS OF A SERIES OF PLANING HULL FORMS WITH 25 DEGREES DEADRISE ANGLE

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Contents.

Introduction.

In 1963 E.P. Clement and D.L. Blount presented their paper on the resistance of a systematic series of Planing Hull Forms [Ref 1.] generally known as the TMB Series 62 or the Clement-Series.

Their results showed the influence on performance of a number of design variables,such as length to beam ratio, the LCG position and displacement, but all of the considered hullforms had a constant deadrise of 12.5^{o}. These data have been used extensively by designers to predict the performance of planing hulls.

During the last decade a growing interest has developed in using planing hulls in more exposed areas, for instance as pilot boats, coast quard vessels, workboats for offshore industry and small naval vessels.
Consequently the seakeeping qualities become more important and one of the methods to improve on the behaviour of a vessel in a seaway is to increase the deadrise angle. This, however, has a marked influence on resistance.

Therefore a systematic model experiment has been carried out with identical models to those used by Clement and Blount in their series, but with a deadrise angle of 25 degrees. These models have been tested with the same variation in design variables as in the original tests performed by Clement and Blount, i.e. the influence of the length-beam ratio, the weight of the vessel and the longitudinal position of the centre of gravity has been examined, but the speed range has been reduced from $0.5 < Fn_{\nabla} < 6.0$ in the Clement tests to $0.75 < Fn_{\nabla} < 3.0$ in the present tests. This was due to limitations imposed by the test facility used.
No attempt has been made to use a more up to date hull as parent hullform since by using similar models and the same test procedure a more systematic set of data could be added to original experimental results. This can be used to ex-

tend the prediction method for the resistance of new designs with a wider range of deadrise angles.

Influence of deadrise angle.

The influence of the deadrise angle of a planing hull on the resistance and seakeeping behaviour has been very clearly demonstrated by J.J. van den Bosch in Ref. [2] .

He used the parent hull of the Clement Series 62 to compare with a model derived from this parent form having a 25 degrees deadrise angle. All other dimensions have been kept equal as far as possible.
From tests in calm water, as well as in regular and irregular head waves he found that the increase in deadrise angle resulted in a considerable gain in seakeeping ability at the cost of a slightly higher resistance. The decrease of the vertical accelerations appeared to be most significant. The 25^{o} deadrise angle boat sat lower in the water than the 12.5^{o} deadrise angle boat, with a smaller trim angle and the motion amplitudes, in particular pitch, were smaller.
Similar results have been found by others.

Therefore the improving of the seakeeping performance of planing craft could very well start with increasing the deadrise angle. The influence of this increase on both resistance, sinkage and trim should then be known and an extension of the original data of Clement and Blount to a 25 degrees deadrise angle boat appeared desirable.

Set up of the Series.

A systematic series of 5 models with different L/B ratio in analogy with the original Clement series has been used for the experiment.
The parent of the new series has been developed from the lines of the Clement parent, increasing the original 12.5 degrees deadrise angle to 25 degrees but keeping all other dimensions as much the same as possible.

Whether the 25 degrees deadrise angle boat always has better seakeeping properties when compared with its 12.5 degrees deadrise angle counterpart irrespective of length beam ratio, displacement or position of centre of gravity, remains to be seen, but experience so far seems to point in that direction.
From this parent model four other models have been designed using the afine transformation technique as described by Versluis in Ref. [3] .
These models have been tested under the same conditions as Clement and Blount used for their series, i.e. different displacements and different longitudinal positions of the centre of gravity with respect to the centroid of the planing surface. For all these variations of the parent model sinkage, trim and resistance have been measured as function of the forward speed.

In the following paragraphs the development of the parent form, the other models and the measurement scheme will be dealt with.

Development of the Parent Model.

For the series of systematically varied length/beam ratio models a new parent model had to be developed For the development of this parent model with 25 degrees deadrise, use has been made of the 12.5 degrees deadrise parent model of the Clement series. This was considered desirable for the comparison between the 12.5 and 25 degrees deadrise planing hulls.
Much effort has been put into the design to keep it as similar to the Clement parent as possible. This resulted in:

- the length on the chine is the same for both parent models.
- the maximum breadth on the chine and the vertical projection of the chine (Bp/BpA) has been kept the same for both models.

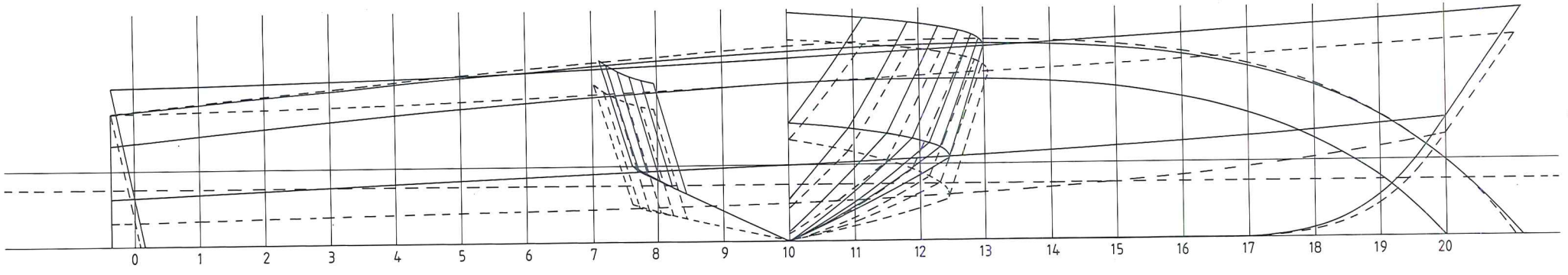


Figure 1: Body plans of the parent model of the Clement series and the present series.

- the vertical projection of the deck line has been kept the same.
- the keel line has been kept the same for both models, except from ordinate 16 forwards where the contour has been lifted upwards to maintain the proper length over the chine.
- the transom slope has been maintained.
- the deadrise angle of the transom has been increased from 12.5 degrees to 25 degrees. The length of the prismatic part of the canoe body has been kept the same.
- the hull form of the new parent model consists entirely of developable surfaces, just as the original Clement parent.

The body plans of both parent forms are shown in figure 1. From this figure it can be seen that the new parent closely ressembles the original parent model of the Clement series. The main particular of both models are presented in Table 1.

The newly developed parent with the 25 degrees deadrise angle also closely ressembles the model as developed by Van den Bosch for his investigation in the seakeeping performance of the high deadrise angle boat, although some minor discrepancies do occur.

Table 1.

	New parent model	Clement Parent model	
deadrise	25^{o}	12.5^{o}	degrees
L_p	1.500	2.436	m
B_{pA}	0.300	0.487	m
B_{px}	0.367	0.596	m
B_{pT}	0.235	0.381	m
L_p/B_{pA}	5.00	5.00	-
L_p/B_{px}	4.087	4.09	-
B_{px}/B_{pA}	1.2200	1.220	-
B_{pT}/B_{px}	0.640	0.640	-
C_{AP} t.o.v. 10 % L_p	48.8	48.8	%

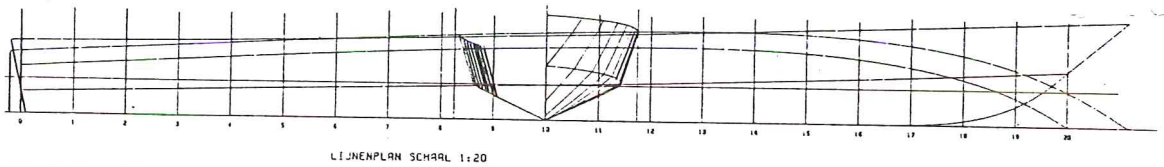
The models.

From the parent model a series of five models including the parent has been developed with varying length to beam ratio's using the afine transformation technique as described by Versluis. This technique uses linear functions to transform the beam and depth of ordinates and the ordinate spacing to develop a new body plan, of predetermined main dimensions. See Ref. [3] .
Some slight modifications have been made to the after bodies of the models with the larger length - beam ratio's i.e. 2.00 and 3.06, in exactly the same way as this has been done by Clement in his original series. This was done to generate designs which are more alike the actual crafts with such low length-beam ratio's i.e. usually small pleasure crafts, which are propelled either by outboard engines on the transom or by the inboard-outboard type of engines and which need more volume of displacement aft then would result from the linear transformation of the parent model.

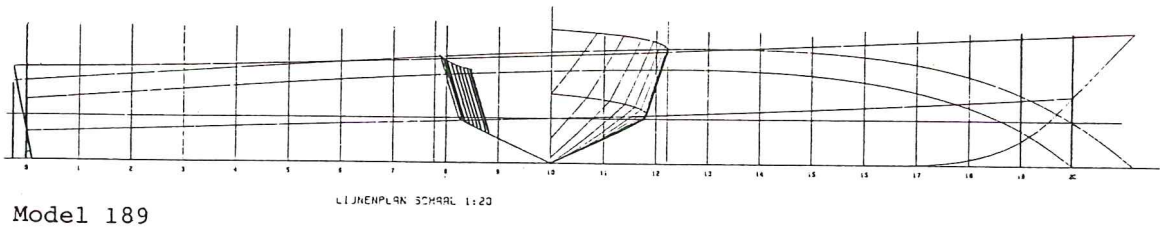
The body plans of the five models of the series are shown in the figures 2 to 7. The main particulars of all five models are shown in Table 2.

The shaft centre line is shown for all the five models in the body plans. Here too the values used by Clement for shaft rake and clearance have been used, i.e. corresponding to a twin shaft arrangement for the parent model. The variation in depth of the shaftline for the other models followed the same pattern of variation as the other body plan dimensions.

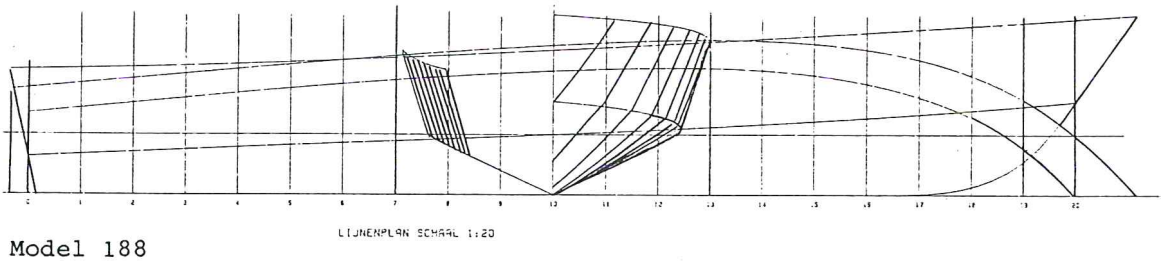
All models had spray strips attached over the entire length of the chine. The bottom of the spray strips followed the line of the bottom of the model from ordinate zero (transom) to ordinate 10 and was horizontal from ordinate 12 to ordinate 20 (the stem) with a transition in the region from ordinate 10 to 12. The width of the spray strips was approximately 4 mm, and they had non radiused edges.



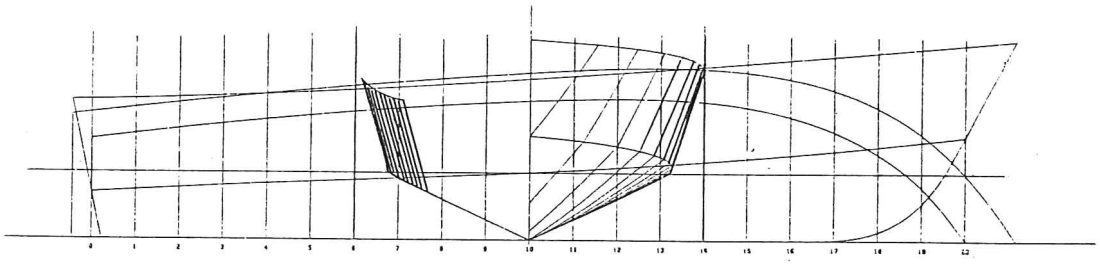
Model 190



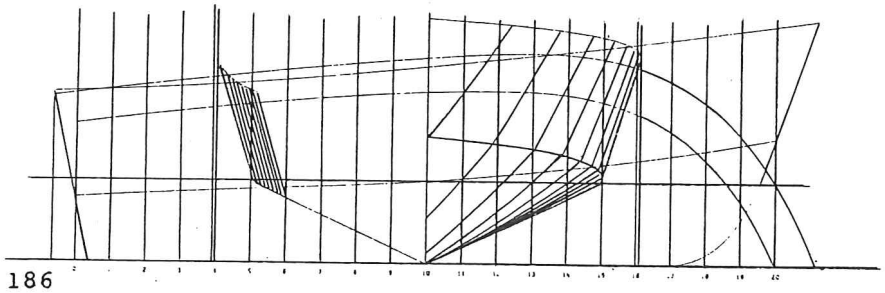
Model 189



Model 188

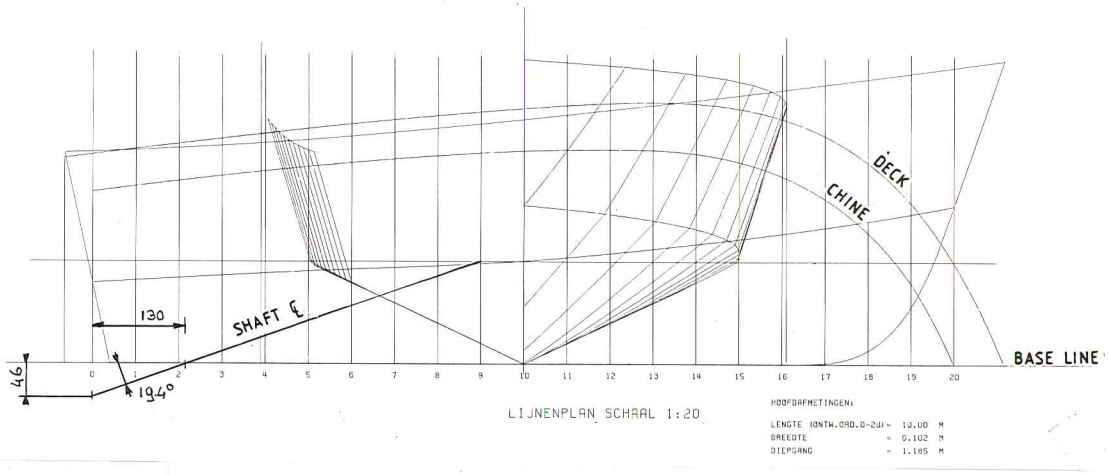


Model 187



Model 186

Figure 2: Body plans of the models.

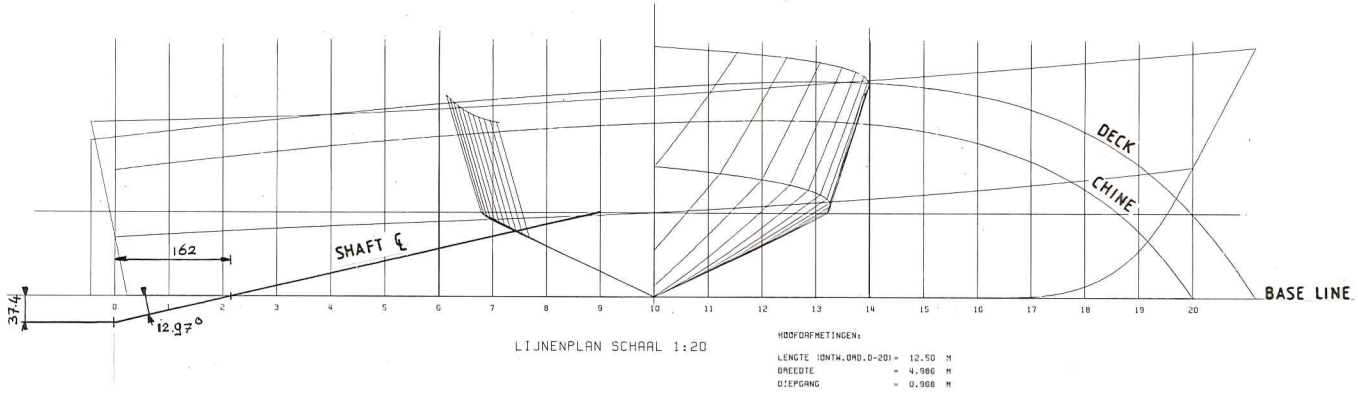


Model 186: Lp/Bpx = 2.00

Lp = 1.00 m.

Bpx = 0.50 m.

Figure 3.

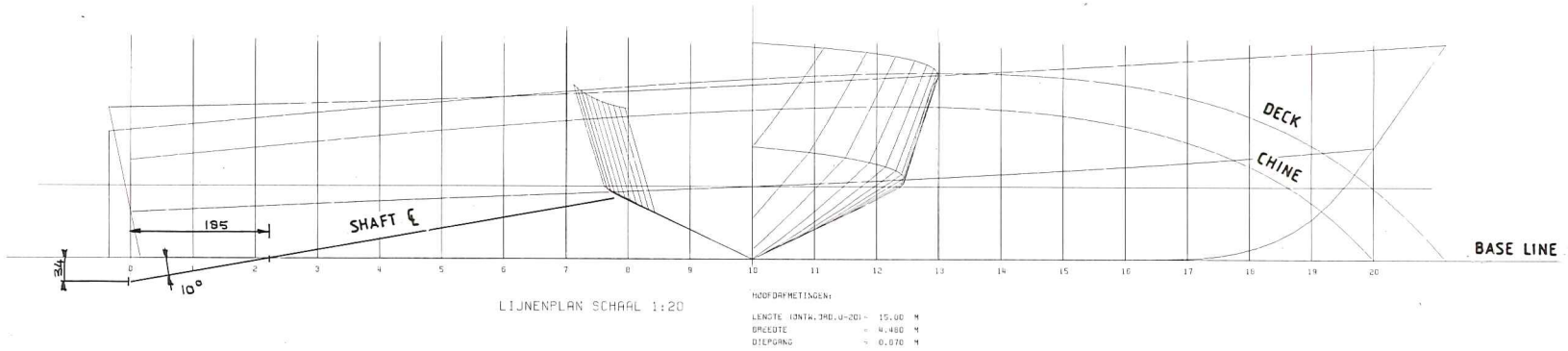


Model 187: Lp/Bpx = 3.06

Lp = 1.250 m.

Bpx = 0.408 m.

Figure 4.

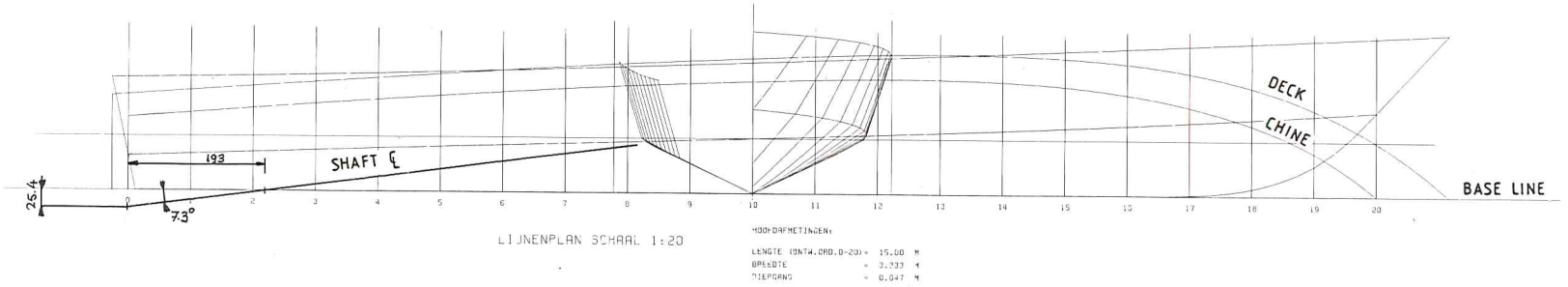


Model 188: Lp/Bpx = 4.09

Lp = 1.500 m.

Bpx = 0.367 m.

Figure 5.

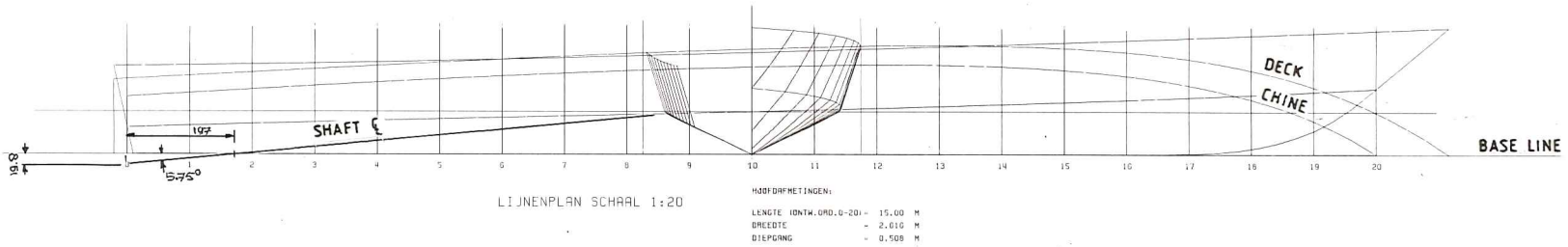


Model 189: Lp/Bpx = 5.094

Lp = 1.500 m.

Bpx = 0.273 m.

Figure 6.



Model 190: Lp/Bpx = 7.01

Lp = 1.500 m.

Bpx = 0.214 m.

Figure 7.

MODEL	186	187	188	189	190
A_P	42.9670 dm^2	42.7700 dm^2	45.0000 dm^2	33.4700 dm^2	26.2800 dm^2
L_P	10.0 dm	12.5 dm	15.0 dm	15.0 dm	15.0 dm
B_{PA}	4.2967 dm	3.4216 dm	3.0000 dm	2.2300 dm	1.7520 dm
B_{PX}	5.00 dm	4.08 dm	3.67 dm	2.73 dm	2.14 dm
B_{PT}	4.000 dm	2.900 dm	2.350 dm	1.750 dm	1.374 dm
L_P/B_{PA}	2.372	3.653	5.000	6.726	8.560
L_P/B_{PX}	2.000	3.064	4.087	5.494	7.010
B_{PX}/B_{PA}	1.1637	1.1920	1.2200	1.2200	1.2200
B_{PT}/B_{PX}	0.8000	0.7108	0.6400	0.6400	0.6420
C_{AP} t.o.v 10 in %	47.1130	47.8792	48.8000	48.8000	48.8000

Table 2: Main particulairs of the models.

The models have been constructed of transparent trovidur plates over frames of the same material and glued together. This enabled through-hull photography for the determination of the wetted surface during the tests.
The spray line was clearly visible on the bottom of the model.
This construction method was enabled by the fact that the hull surfaces were composed of developable surfaces.
The models thus constructed were light, strong and ridgid.

Experimental set-up.

The tests have been carried out in the nr. 1 towing tank of the Ship Hydromechanics Laboratory of the Delft University of Technology. Dimensions of the tank are length 150 m, width 4.50 meters, depth 2.5 meters.
The models have been connected to the towing carriage in such a way, that they were free in pitch and heave but restrained in all other modes of motion.
The pivot of the construction was situated at the intersection of the cross section at the longitudinal position of the Centre of Gravity and the assumed shaft line of the main propulsors.
A strain gauge type dynamometer has been placed on the hinge for the measurement of the resistance force.
The vertical displacement at the stern and the bow were measured by two wire over potentiometers.
These signals were analogously transformed by addition and subtraction to yield a signal for heave and pitch. Both signals have been recorded on a ultra violet recorder and manually elaborated into the actual sinkage and trim of the model.
During each run a photo has been taken through the transparant bottom of the model for the determination of the wetted length on keel and chines, and the wetted surface.
The wetted lengths showed clearly on the transparent models. No turbulence stimulators have been used on the models, since model scale and towing speed were considered to be large enough to yield reliable results.
No towing speeds below 1.0 m/s have been used.

Measurement scheme.

The tests program consisted of all combinations of the following parameters:

L/B:	2.00	3.06	4.09	5.50	7.00	
$A_p/\nabla^{2/3}$:	4.0	5.5	7.0	8.5		
LCG:	0	4	8	12% L_p aft centroid		
Fn_∇:	0.75	1.00	1.25	1.50	1.75	2.00
	2.25	2.50	2.75	3.00		

Total number of tests approximately 800.

Some combinations of small value of $A_p/\nabla^{2/3}$ (high displacement) and LCG 12% L_p aft of centroid (heavy trim by the stern) have been omitted due to the fact that in particular cases the aft deck of the model submerged at rest. These situations were considered to be impractical.

Although the variation in the geometric parameters is kept the same as with the original Clement series, this is not true for the towing speed. Due to limitatation of the towing carriage Froude numbers exceeding $Fn_\nabla = 3.0$ were not possible. However speeds smaller than $Fn_\nabla = 3.0$ are of primary importance in most actual design cases.

Results.

The results of the investigation are presented as tabulated data for each run in the Appendix to this report. With the aid of these data it is possible to calculate the resistance, sinkage and trim of any desired planing hull within the parameter space as given by the experiment. The tables contain data on speed, resistance, sinkage, trim and the wetted length over the keel and the chine as well as the wetted surface. The later refer to the parts of the bottom of the models in contact with solid water only and have been derived from photographs. The relatively small parts of the sides of the models in contact with

solid water at the lowest speeds only have been omitted. None of the results of the tests on model scale have been plotted, since they are not directly comparable to the original Clement and Blount results, who used larger models.
Therefore the resistance data have been expanded to weights of displacements of 45000 N and 450000N, corresponding to the same weights and sizes as used by Clement and Blount. Apart from the fact that this makes a comparison with the 12.5 degrees deadrise angle boats possible, it also has the advantage that the results can be used immediately to predict the resistance of two representative types of vessels, i.e. a medium sized motor yacht and a small patrol vessel.

For the expansion of the resistance data use has been made of the Schoenherr friction coefficients with zero roughness allowance. The Schoenherr coefficients have been preferred rather than the usual I.T.T.C. 57 friction line because of the comparison with Clement and Blount data.

The resistance divided by the boats weight of displacement i.e.: R/Δ as well as the trim angle are presented in the figures 8 to 12 for the 45000 N displacement and in the figures 13 to 17 for the 450000 N displacement.
The figures are arranged in order of increasing length to beam ratio. For each model four graphs are shown corresponding to four values of the area coefficient. In each graph four curves corresponding to the four LCG locations investigated are given.

In the figure 18 the resistance has been plotted as function of the length to beam ratio for five different Froude numbers and four different loading factors $A_p/\Delta^{2/3}$
From this figure it can be seen that for the speed range under consideration the larger L/B ratio's have less resistance. In particular this holds true for the speed range from $Fn_\nabla = 1.0$ to $Fn_\nabla = 2.5$ where the low L/B ratio hulls show a significant hump in their resistance curves.

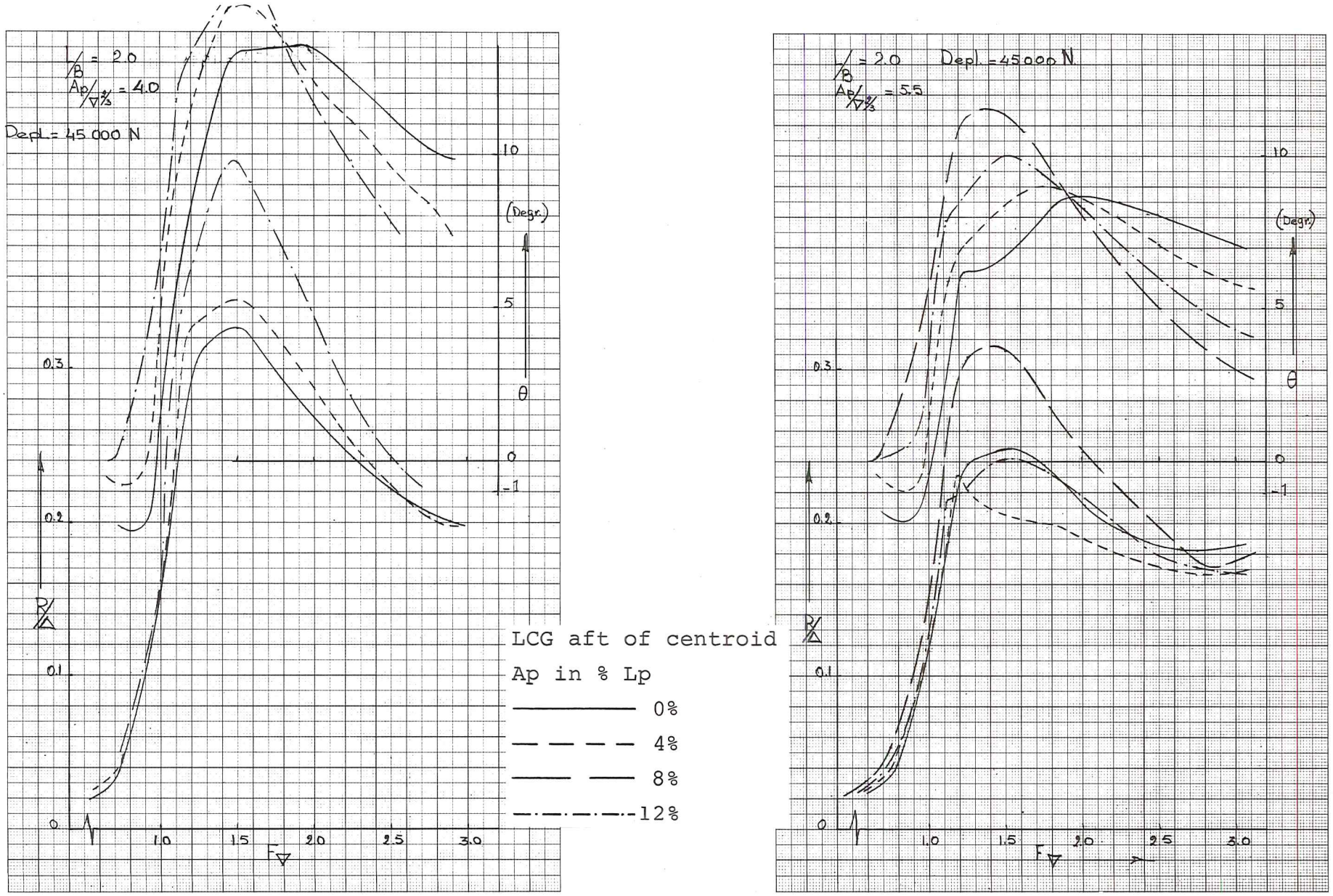


Figure 8: Resistance/weight ratio and angle of attack versus speed coëfficiënt Lp/Bpx = 2.0 Δ = 45 000 N.

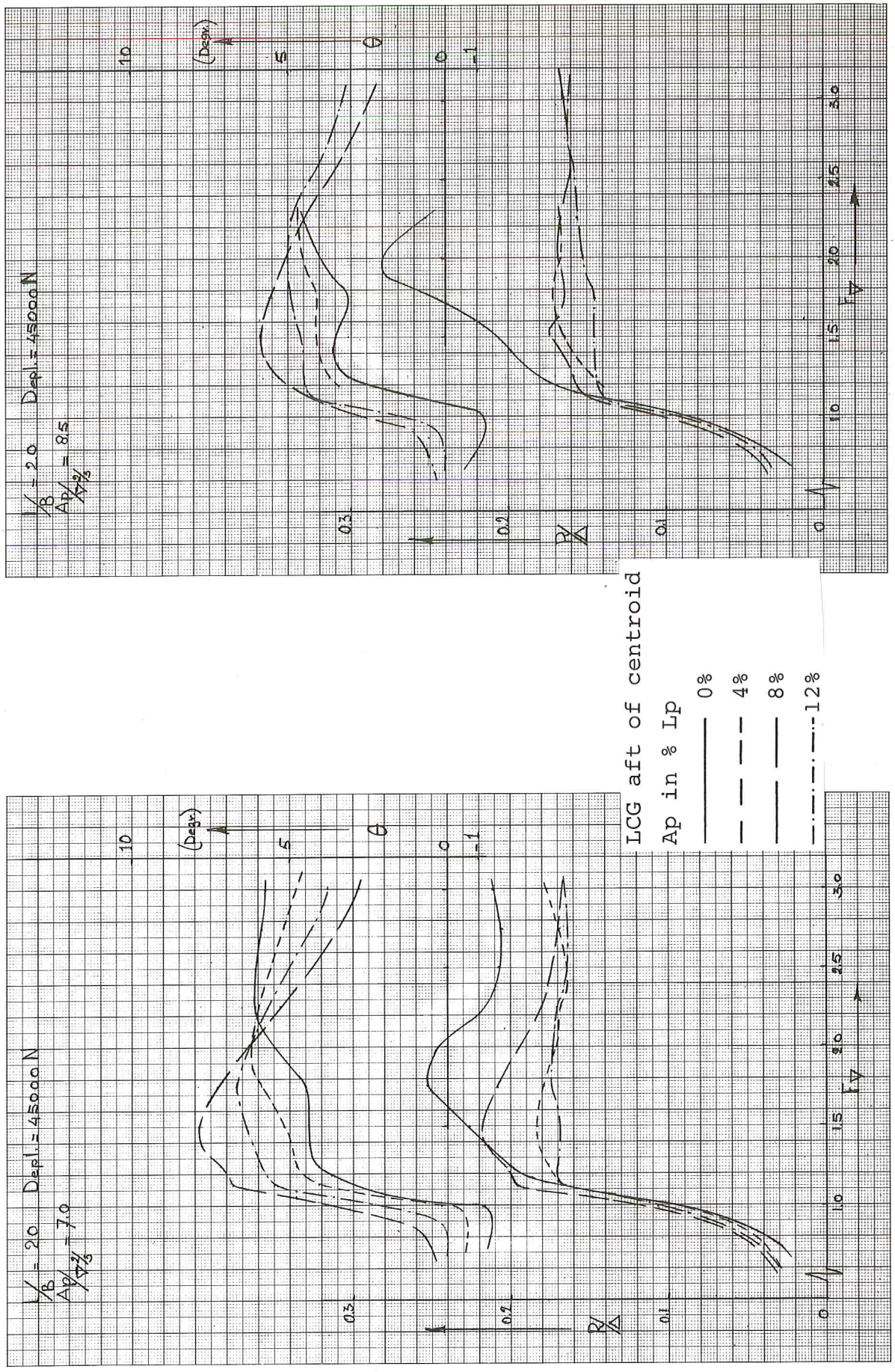


Figure 8: Continued.

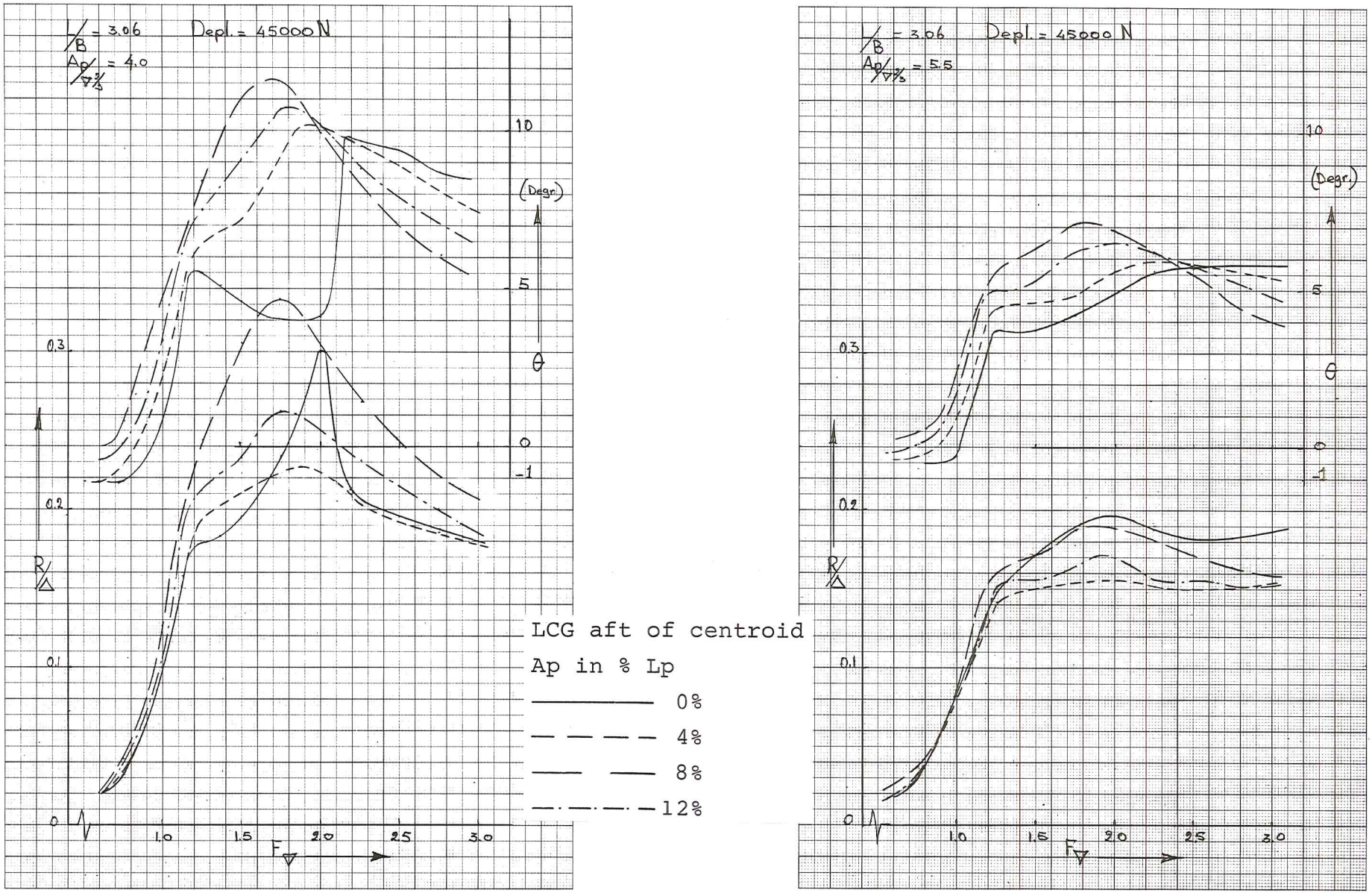


Figure 9: Resistance/weight ratio and angle of attack versus speed coëfficiënt Lp/Bpx = 3.06 Δ = 45 000 N.

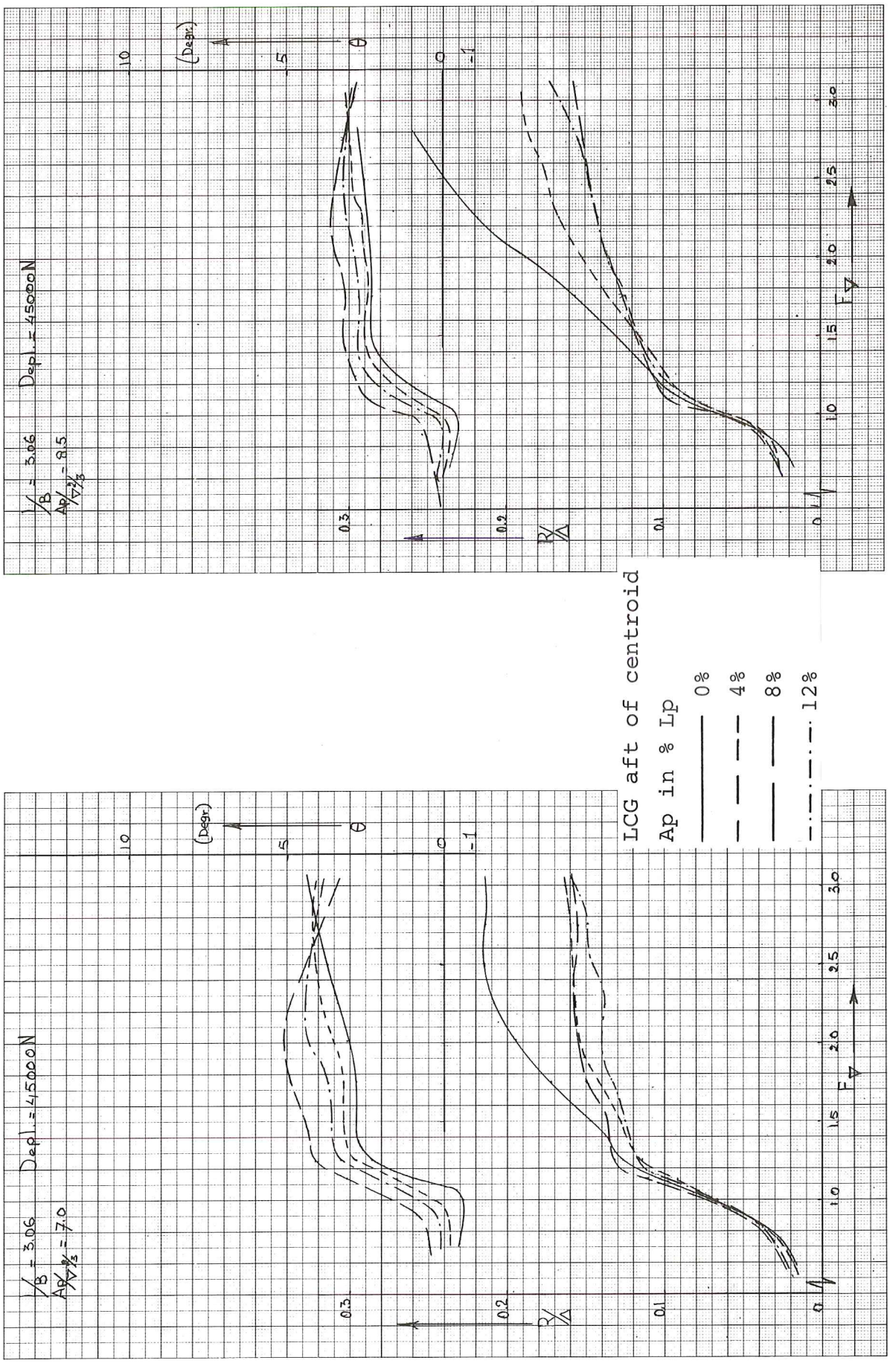


Figure 9: Continued.

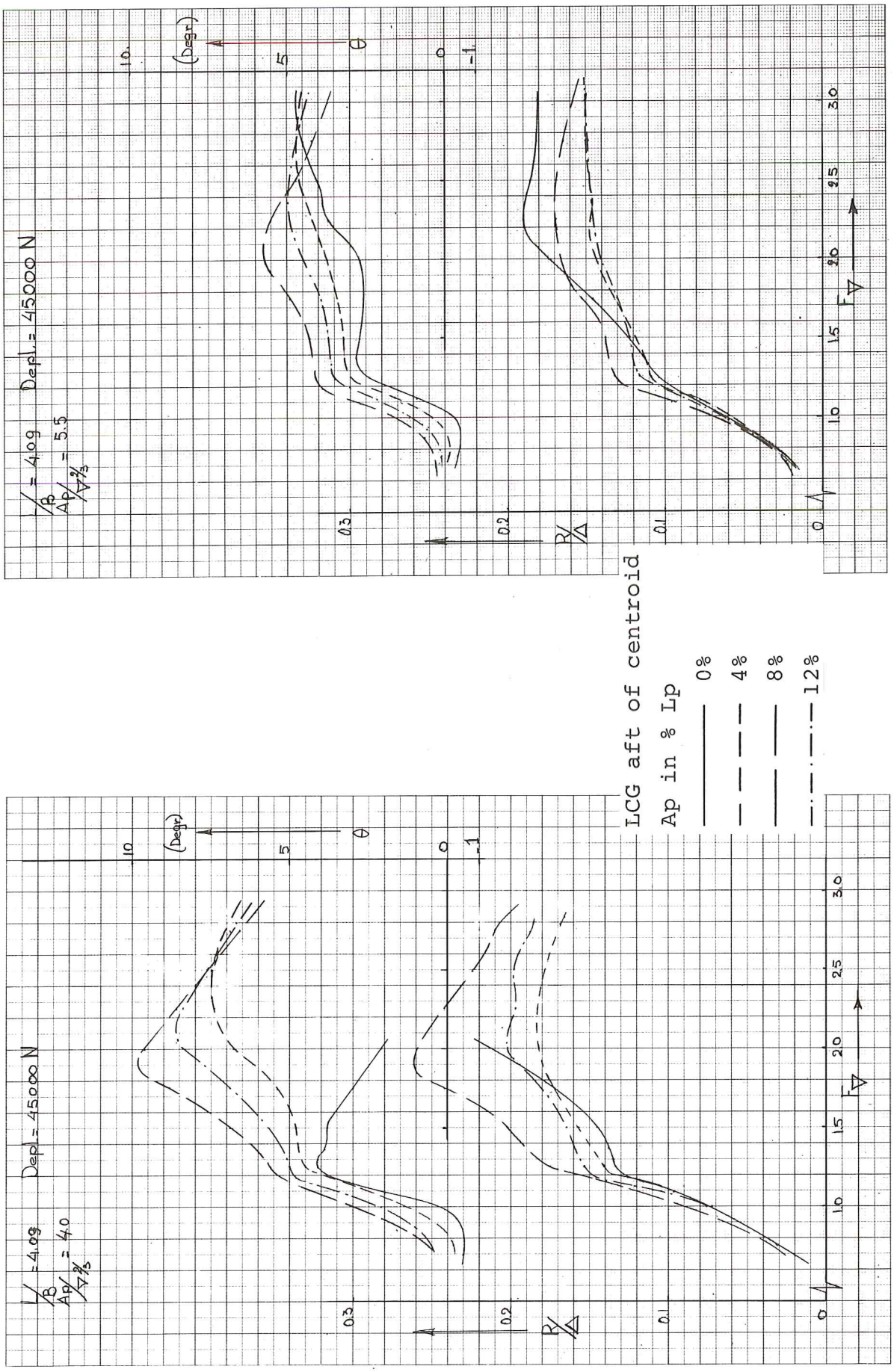


Figure 10: Resistance/weight ratio and angle of attack versus speed coëfficiënt Lp/Bpx = 4.09 Δ = 45 000 N.

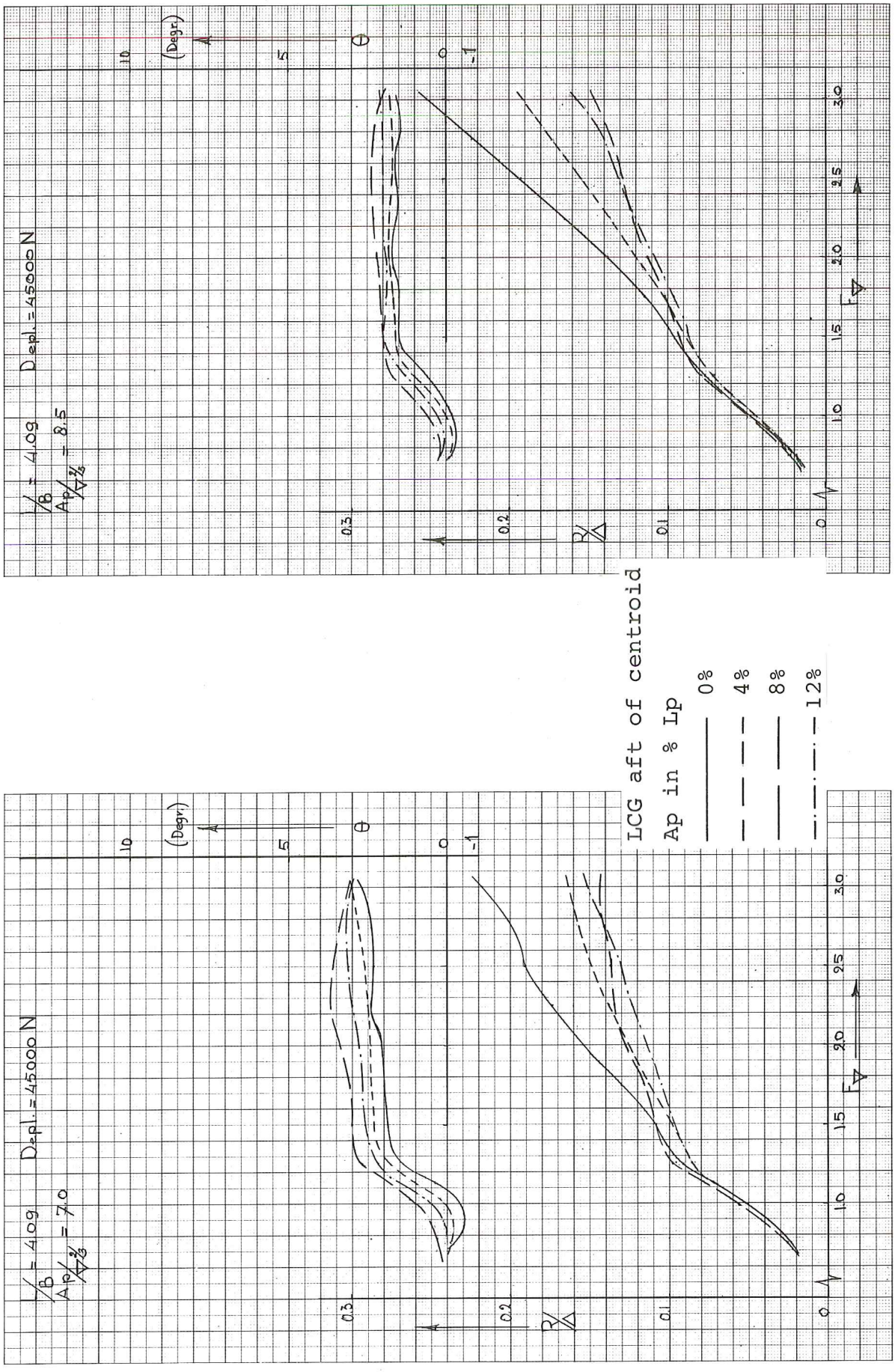


Figure 10: Continued.

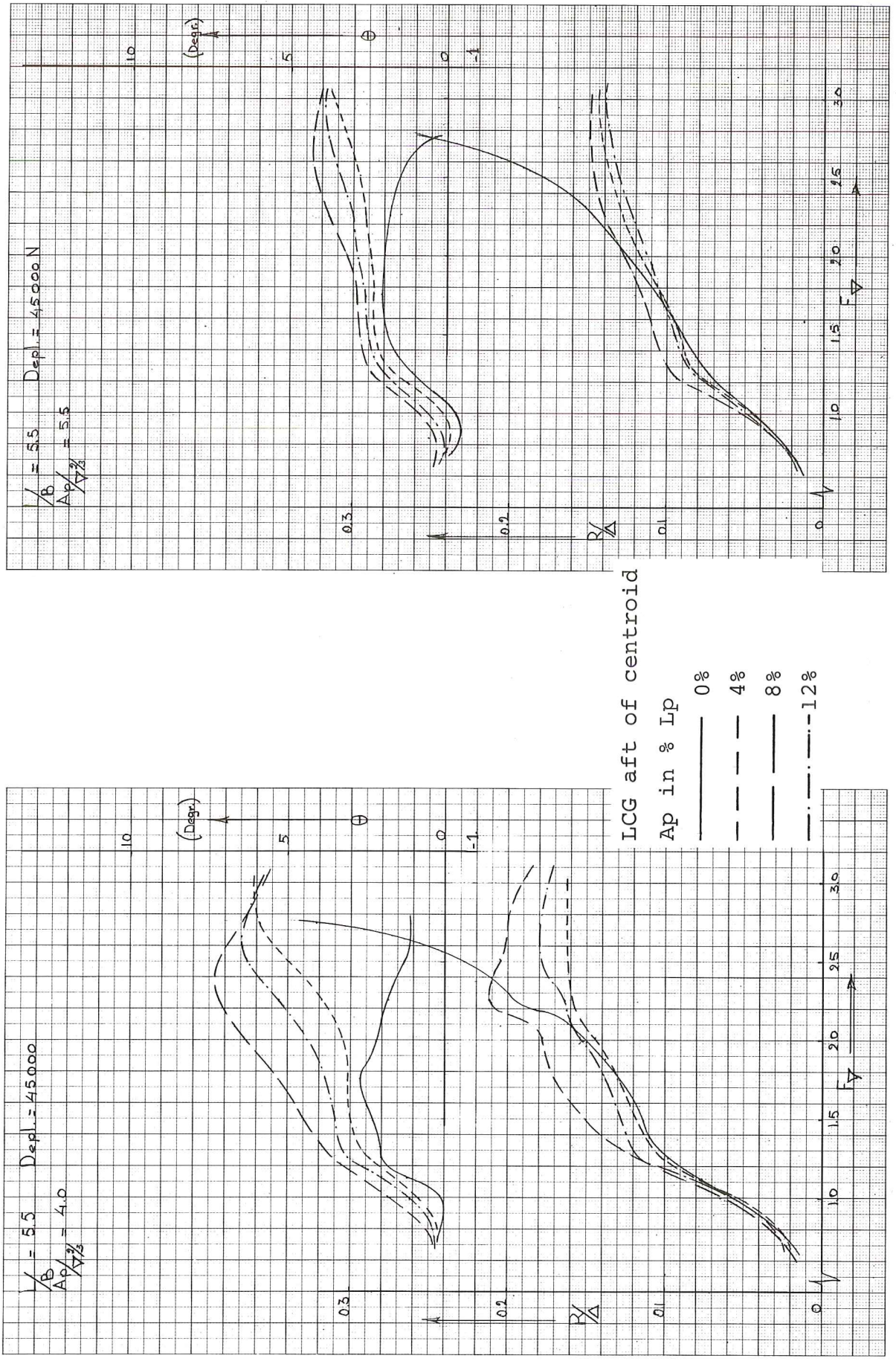


Figure 11: Resistance/weight ratio and angle of attack versus speed coëfficiënt Lp/Bpx = 5.50 Δ = 45 000 N.

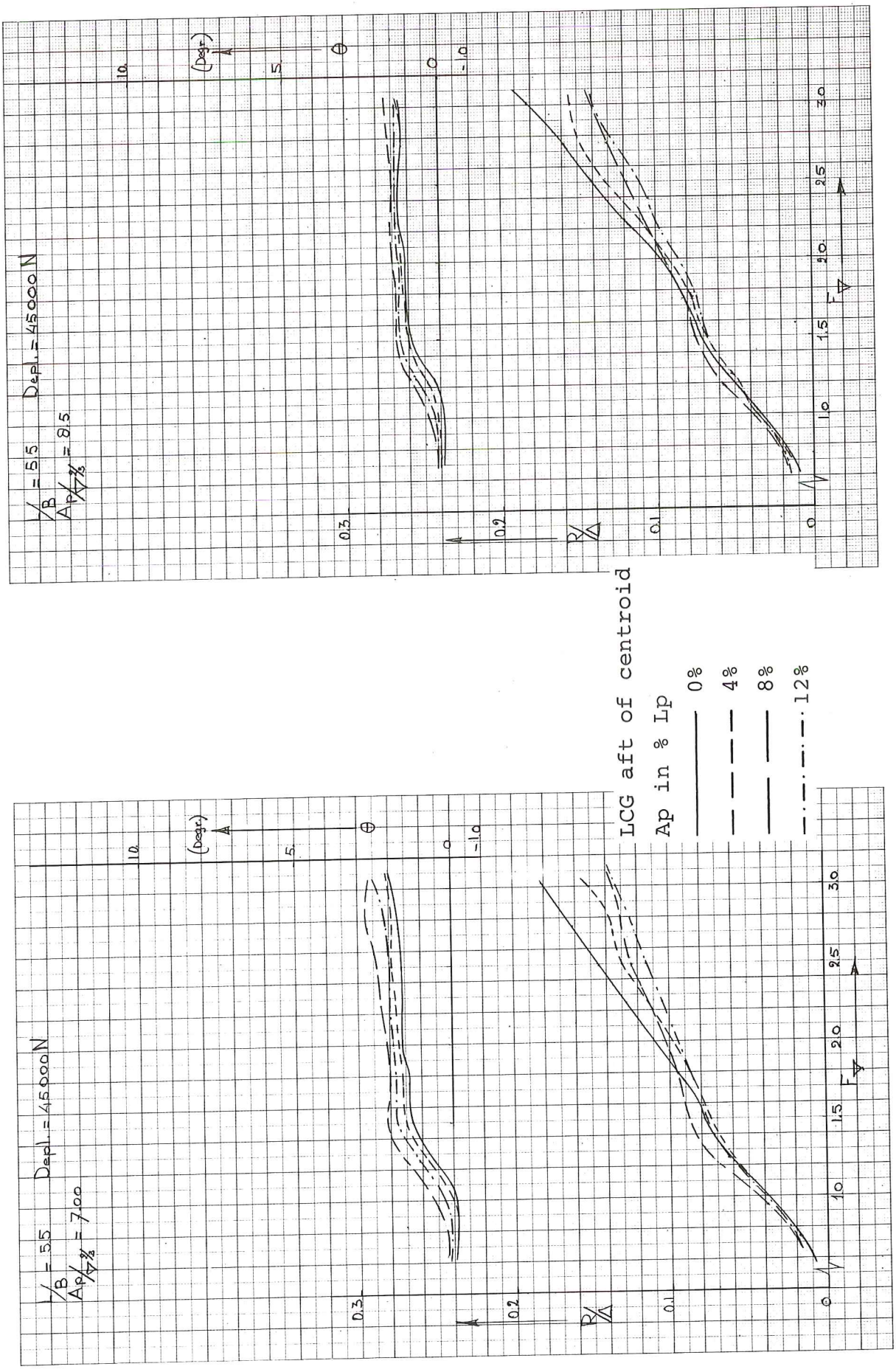


Figure 11: Continued.

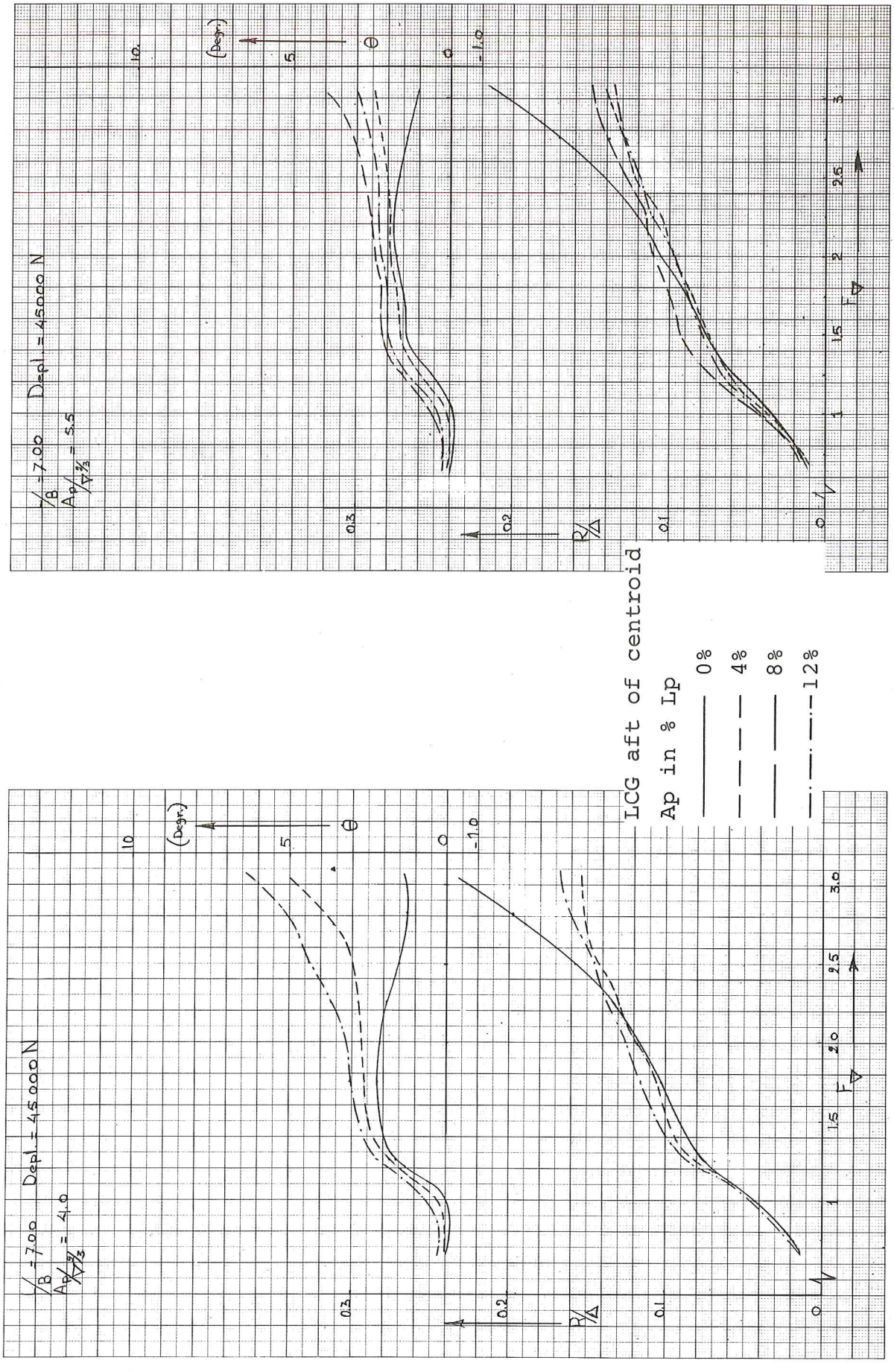
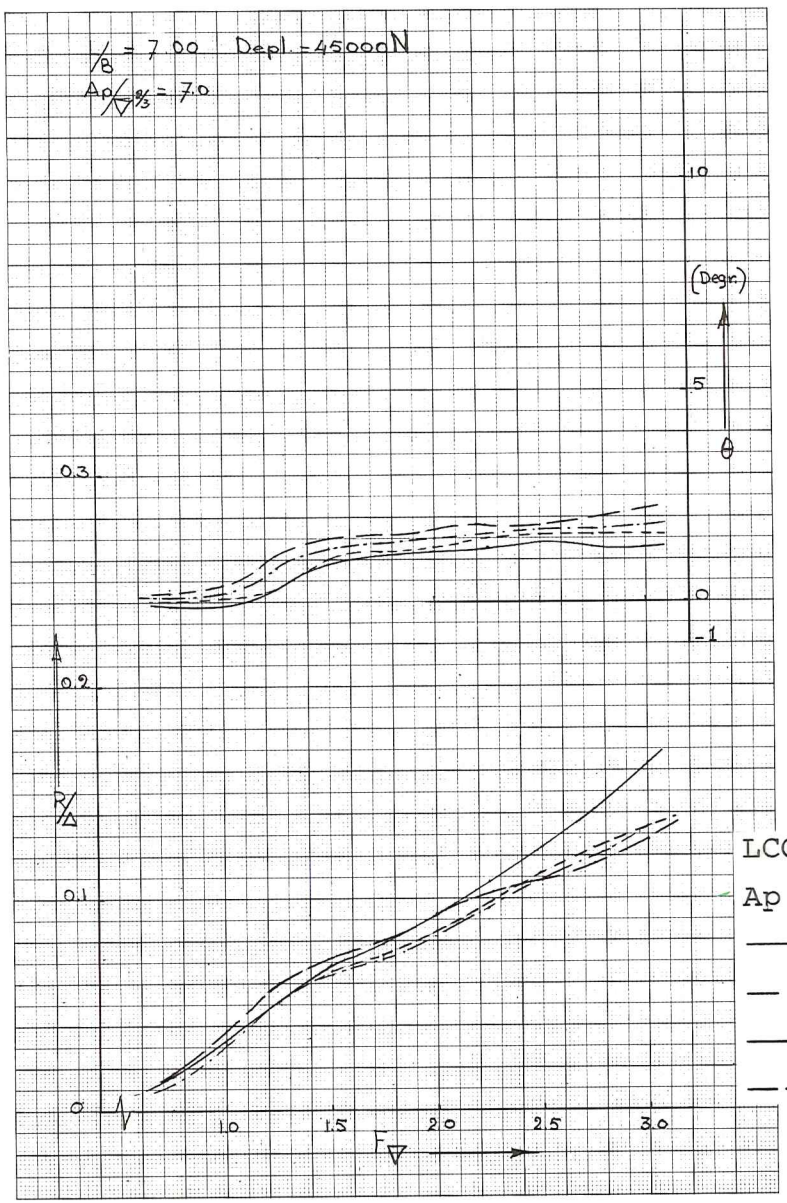


Figure 12: Resistance/weight ratio and angle of attack versus speed coëfficiënt Lp/Bpx = 7.00 Δ = 45 000 N.



LCG aft of centroid

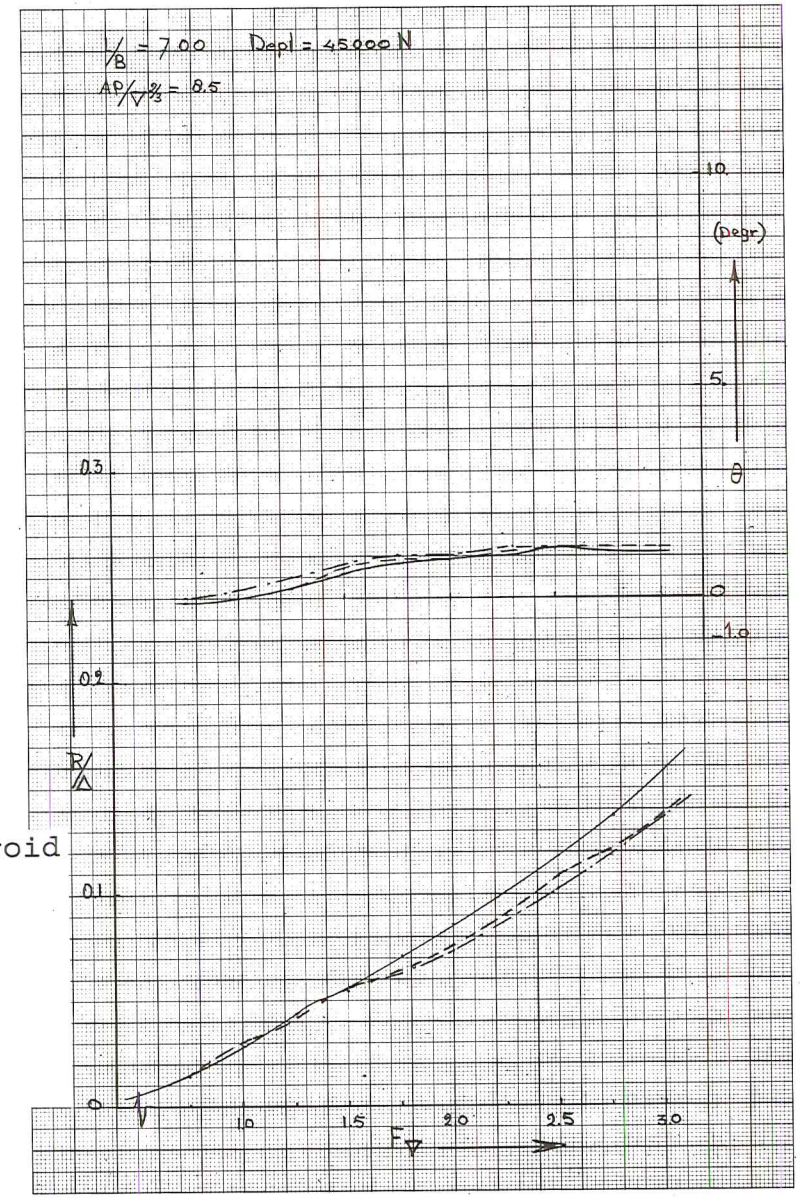
Ap in % Lp

———— 0%

— — — — 4%

—— —— 8%

—·—·—·— 12%



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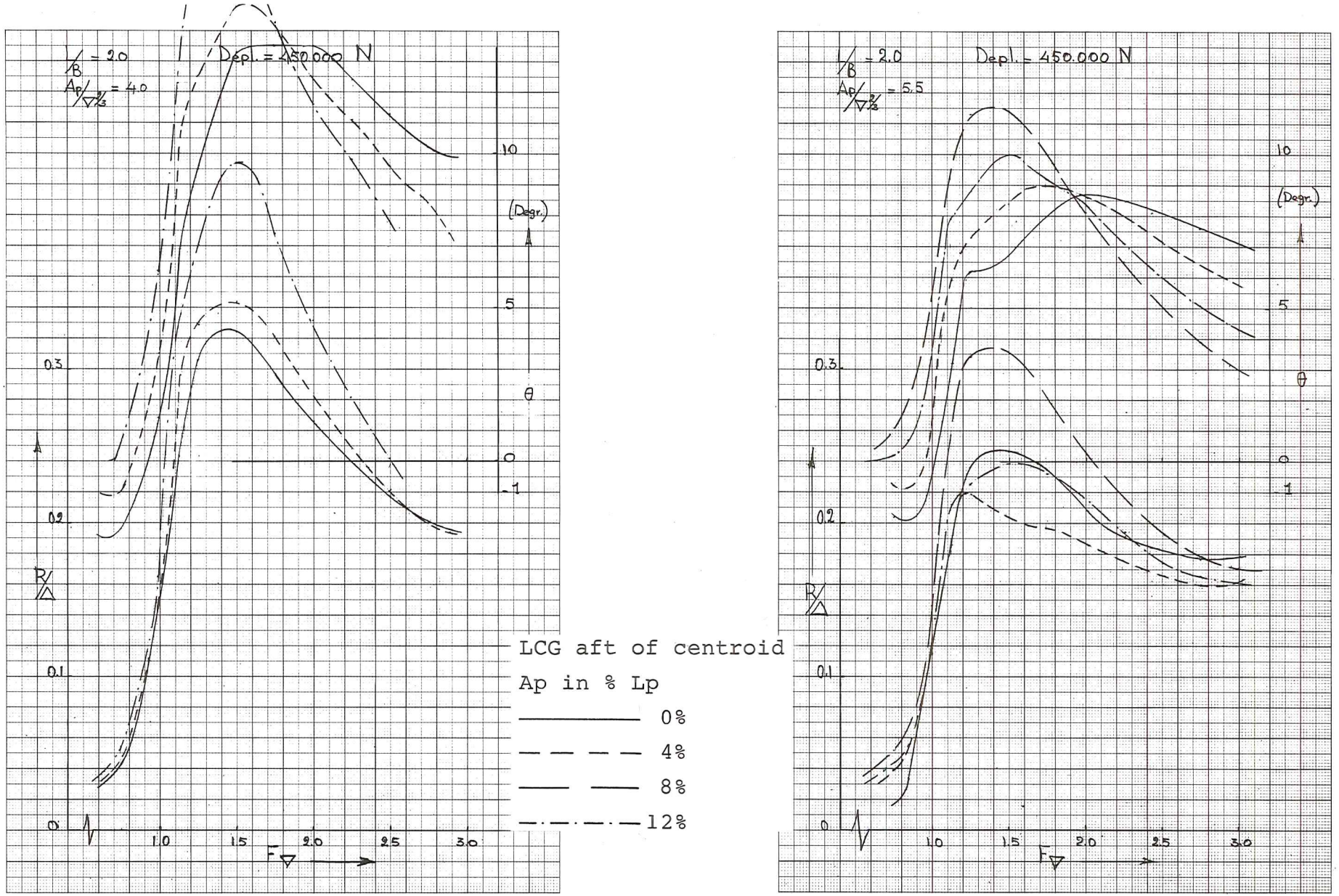

Figure 13: Resistance/weight ratio and angle of attack versus speed coëfficiënt Lp/Bpx = 2.00 Δ = 450 000 N.

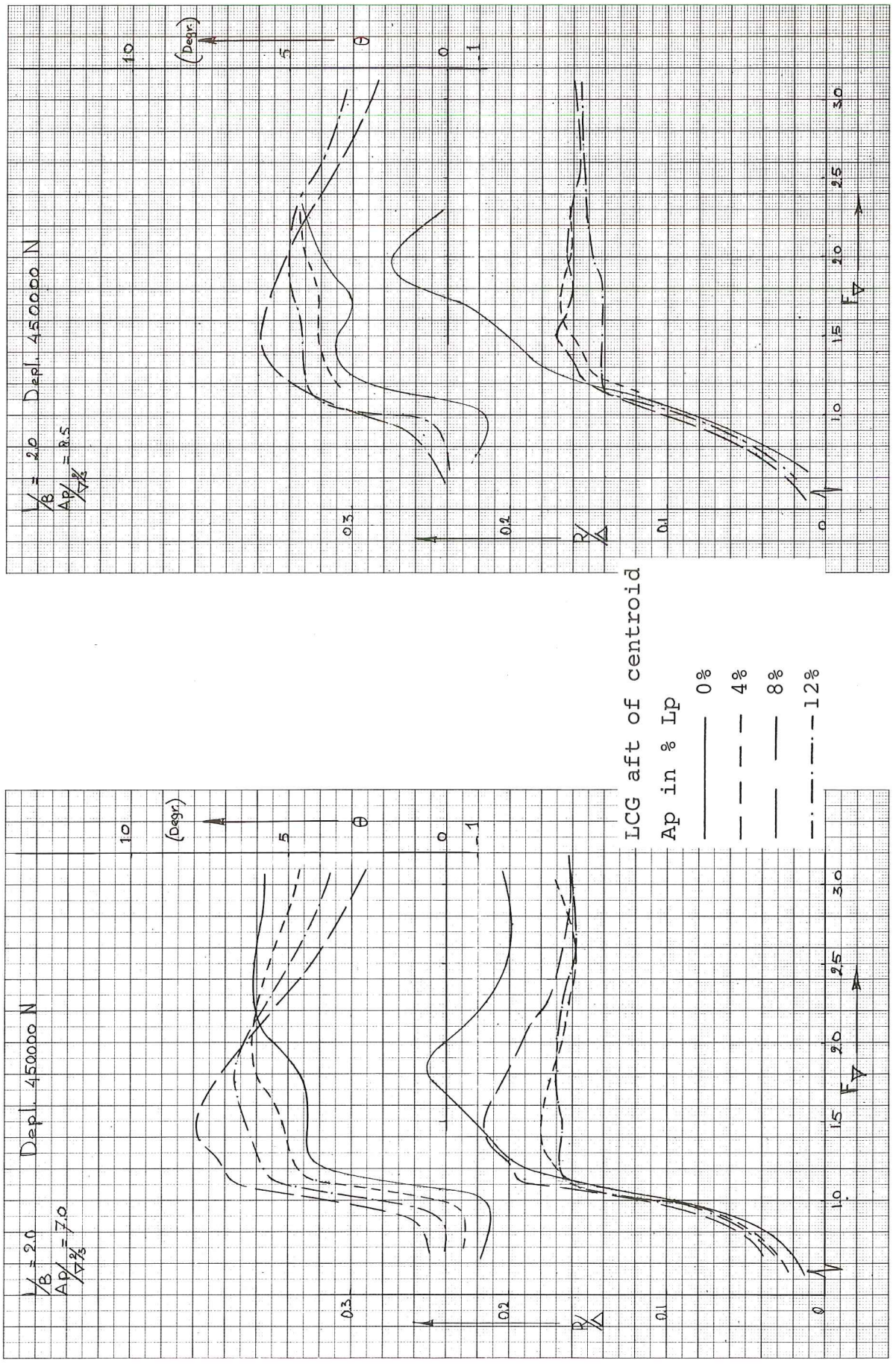

Figure 13: Continued.

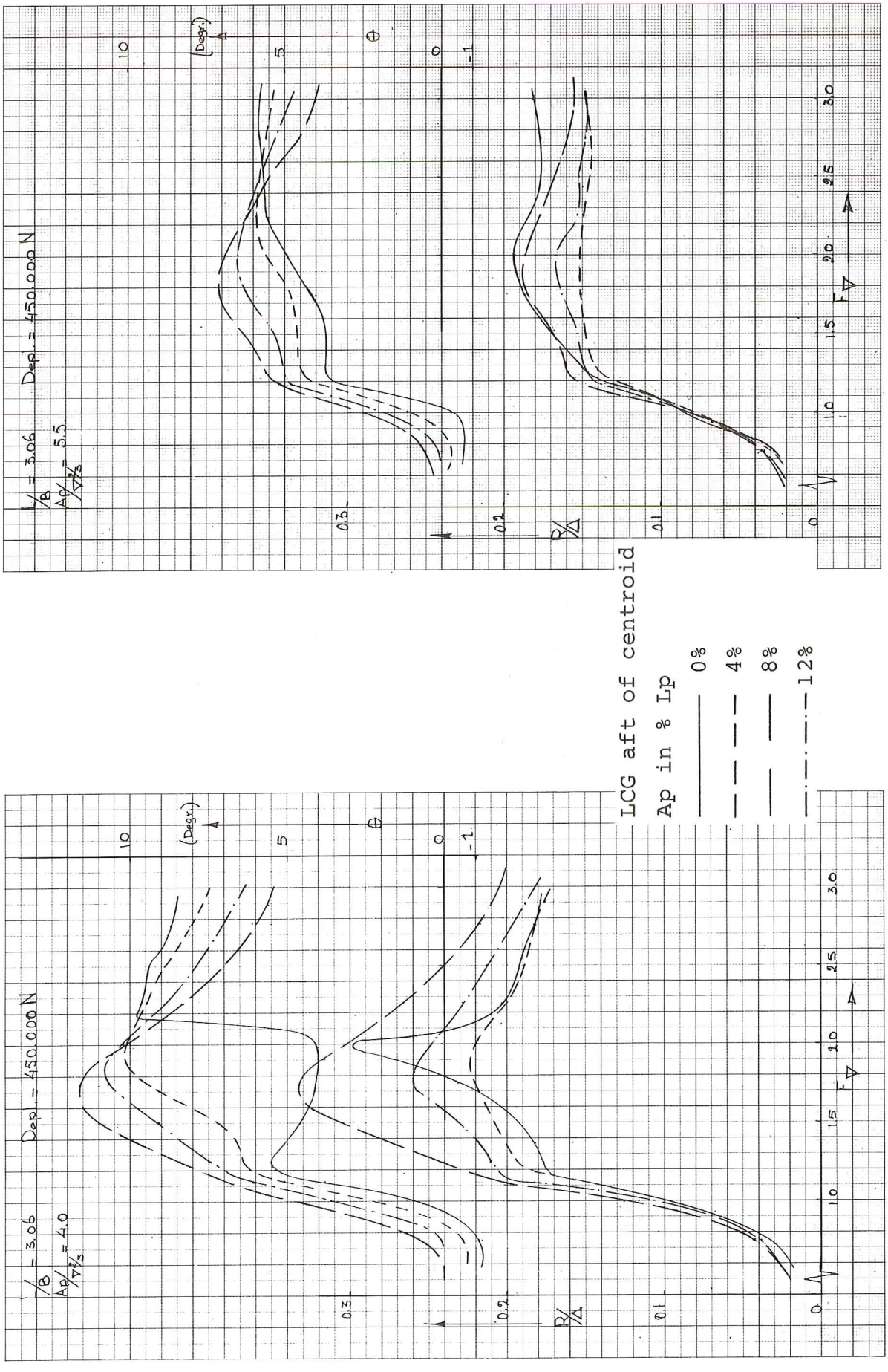

Figure 14: Resistance/weight ratio and angle of attack versus speed coëfficiënt Lp/Bpx = 3.06 Δ = 450 000 N.

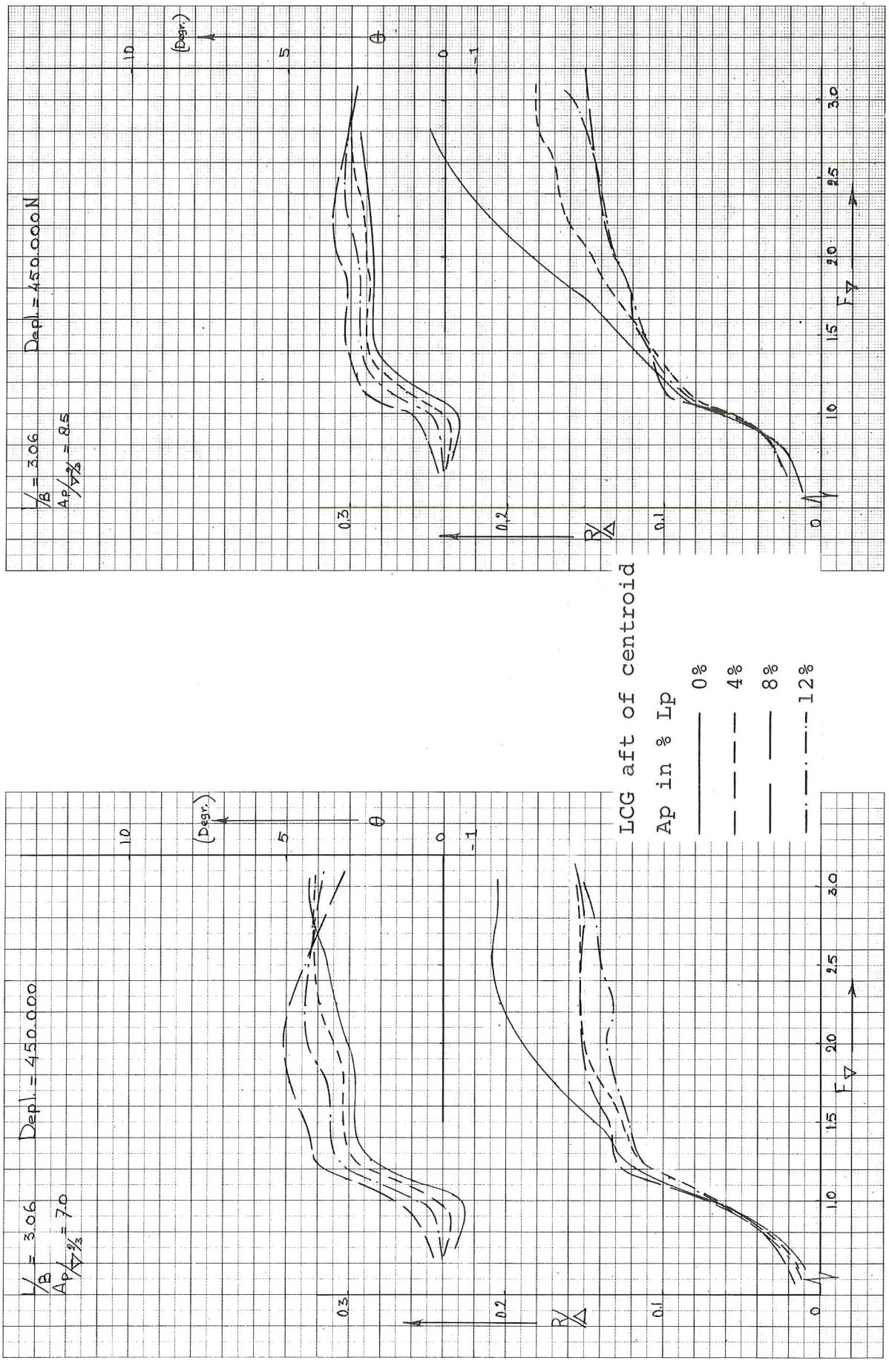

Figure 14: Continued.

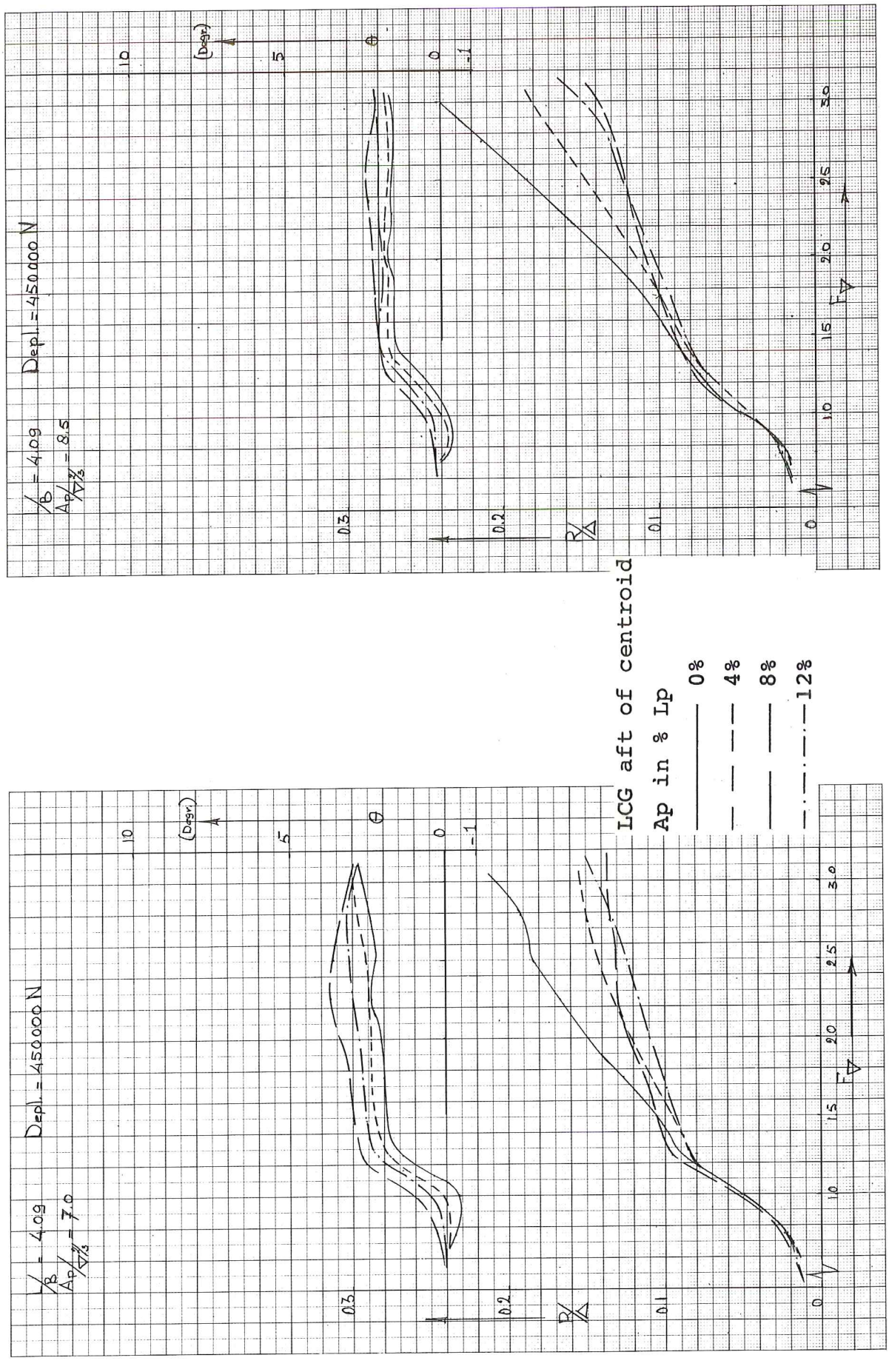

Figure 15: Continued.

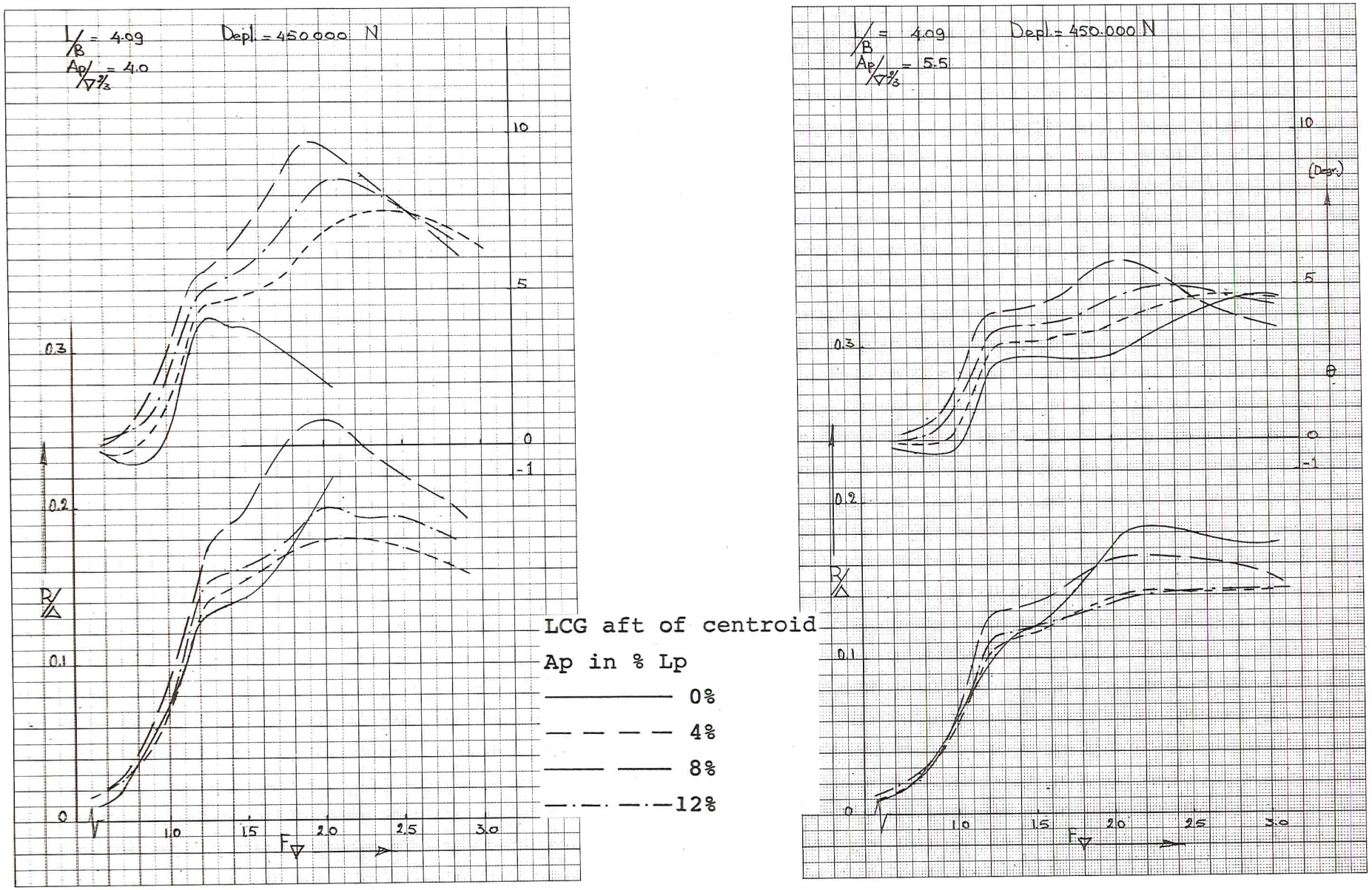

Figure 15: Resistance/weight ratio and angle of attack versus speed coëfficiënt Lp/Bpx = 4.09 Δ = 450 000 N.

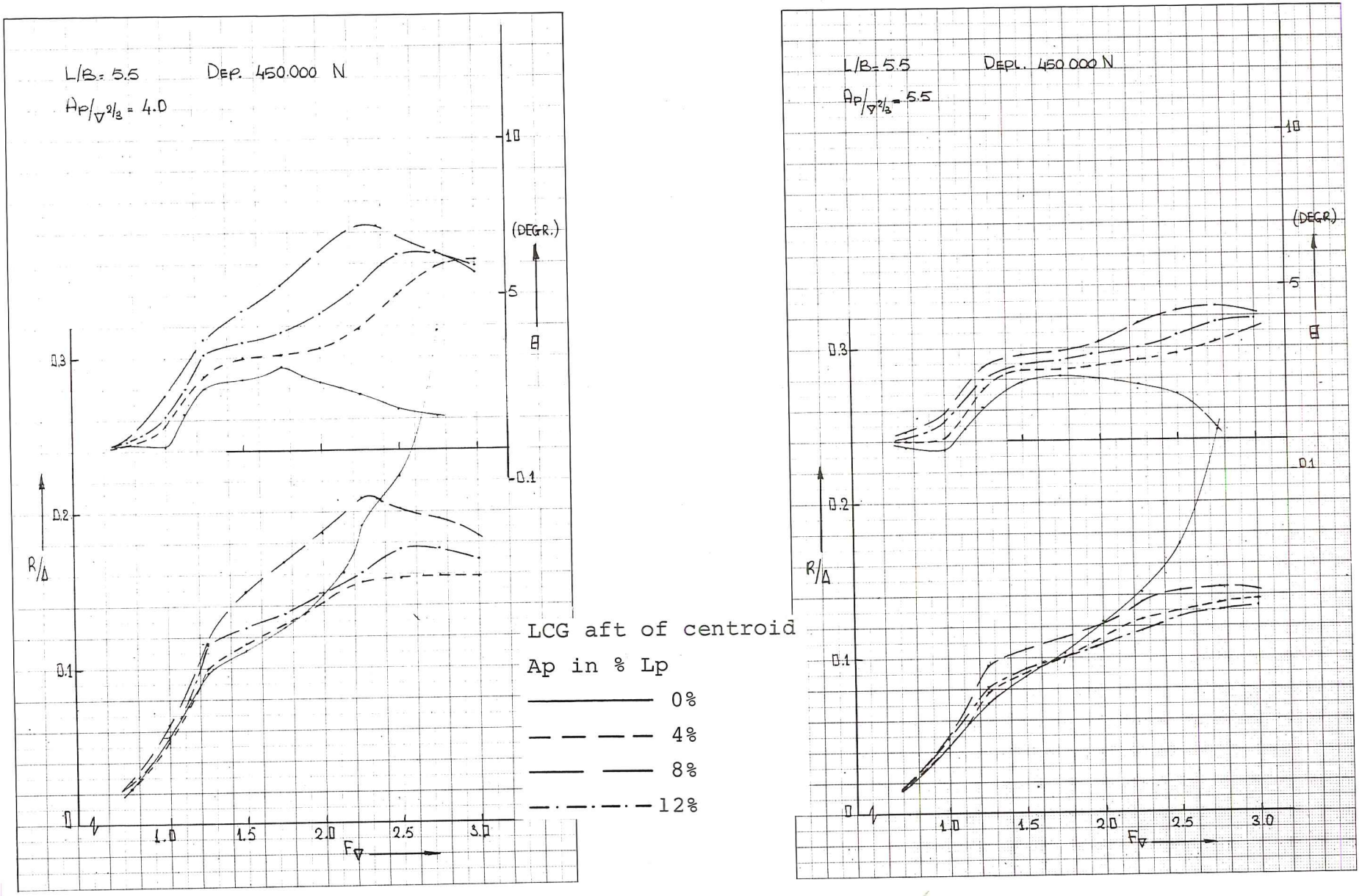

Figure 16: Resistance/weight ratio and angle of attack versus speed coëfficiënt Lp/Bpx = 5.50 Δ = 450 000 N.

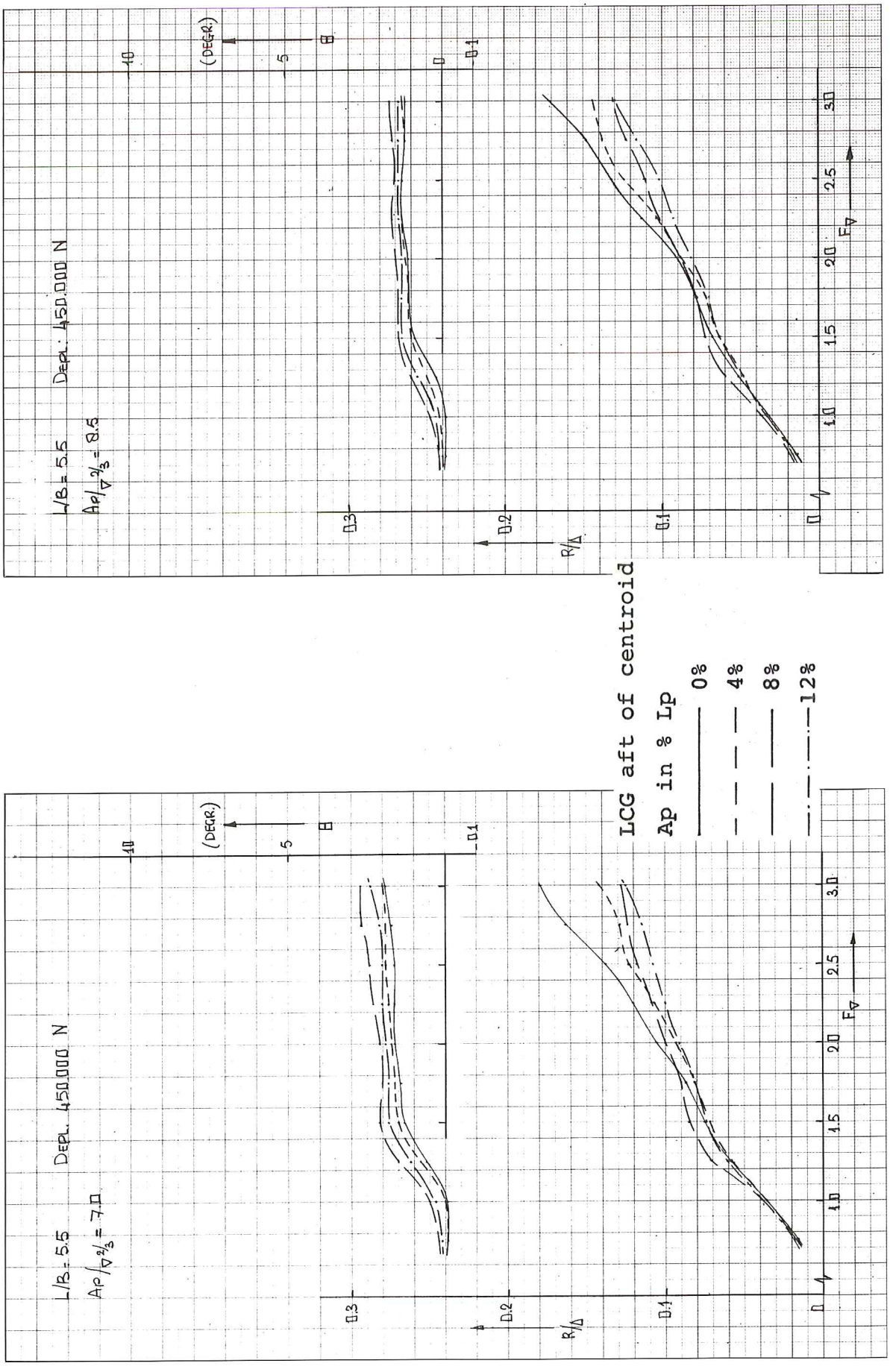

Figure 16: Continued.

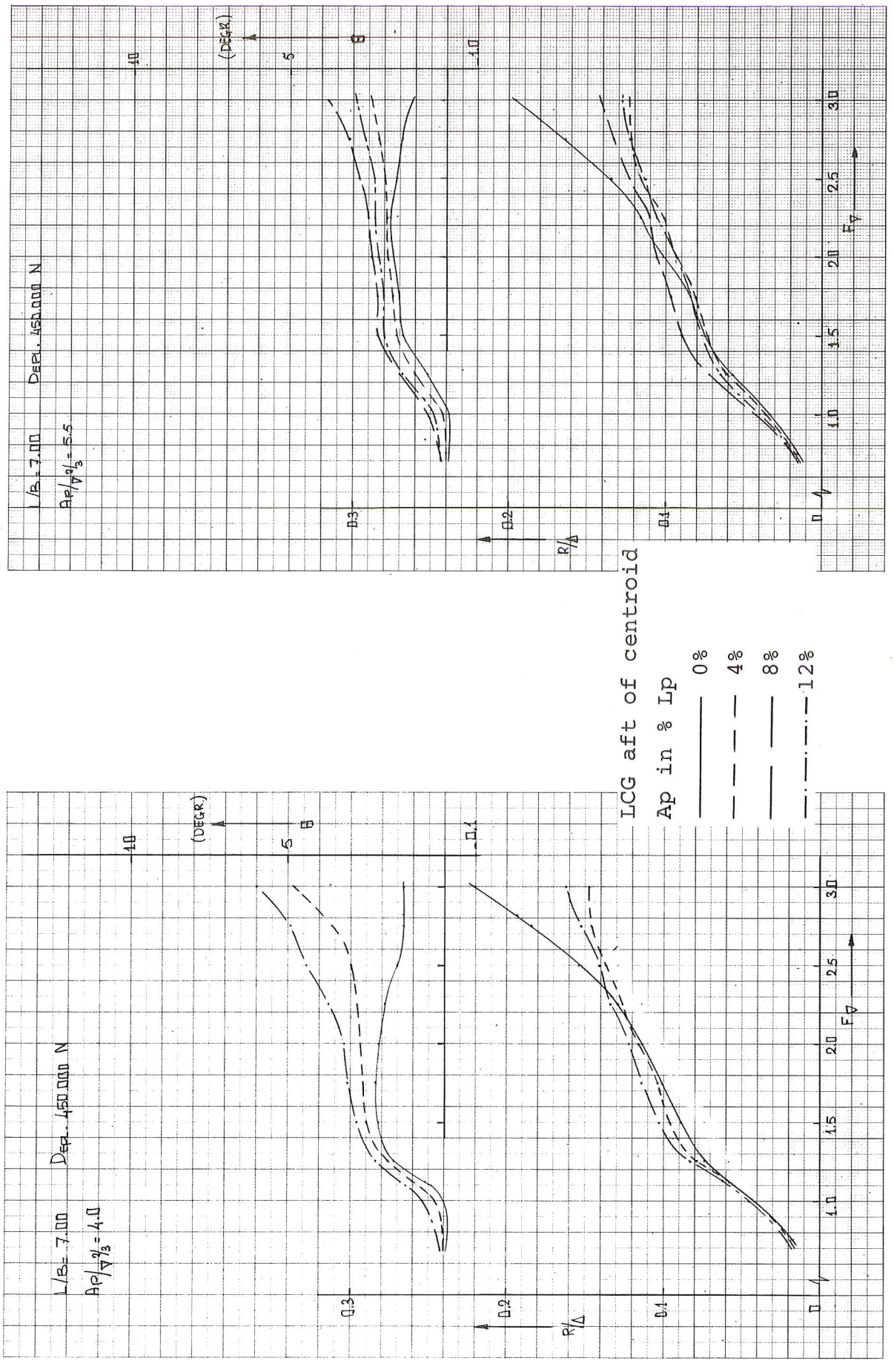

Figure 17: Resistance/weight ratio and angle of attack versus speed coëfficiënt Lp/Bpx = 7.00 Δ = 450 000 N.

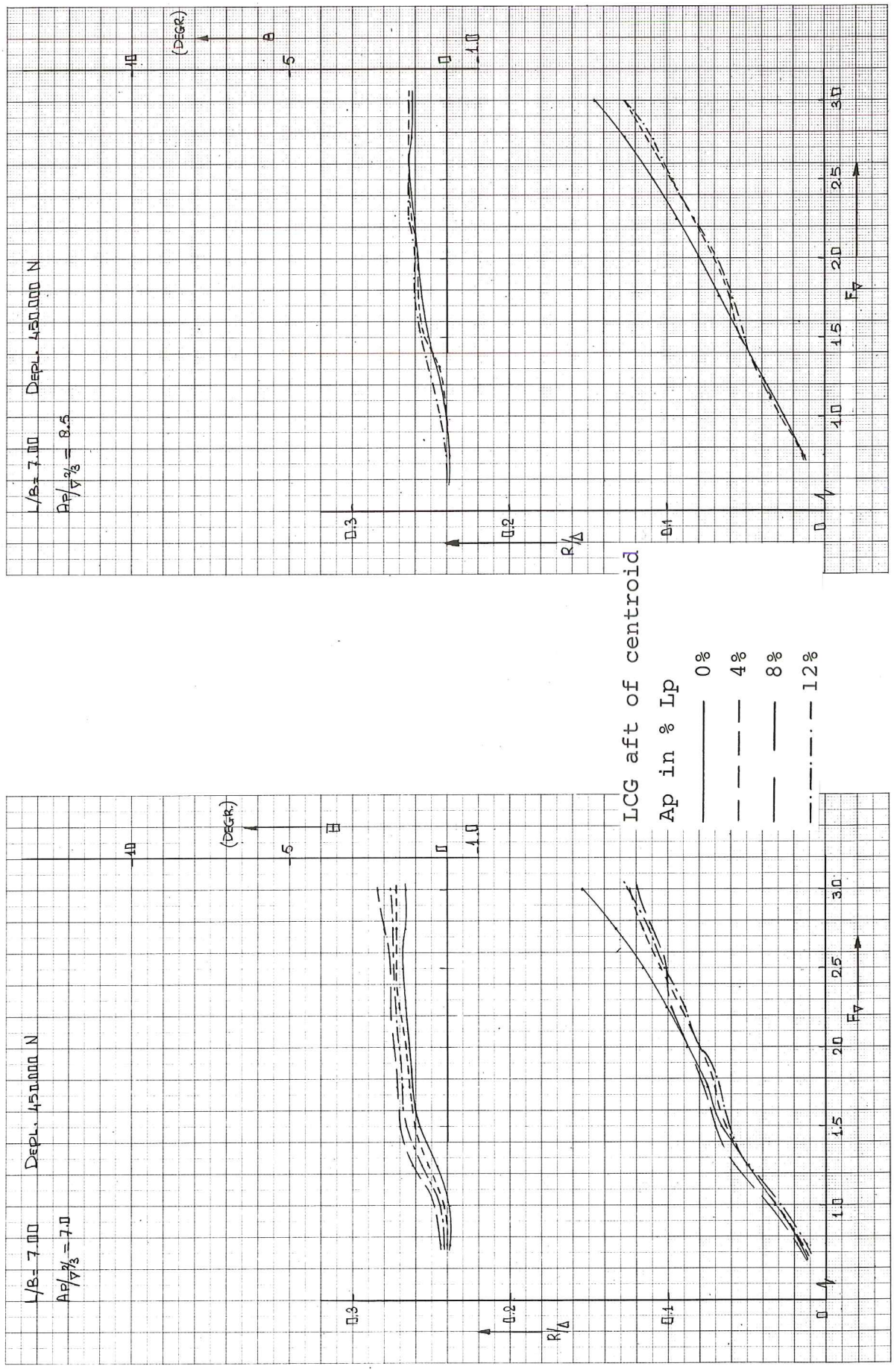

Figure 17: Continued.

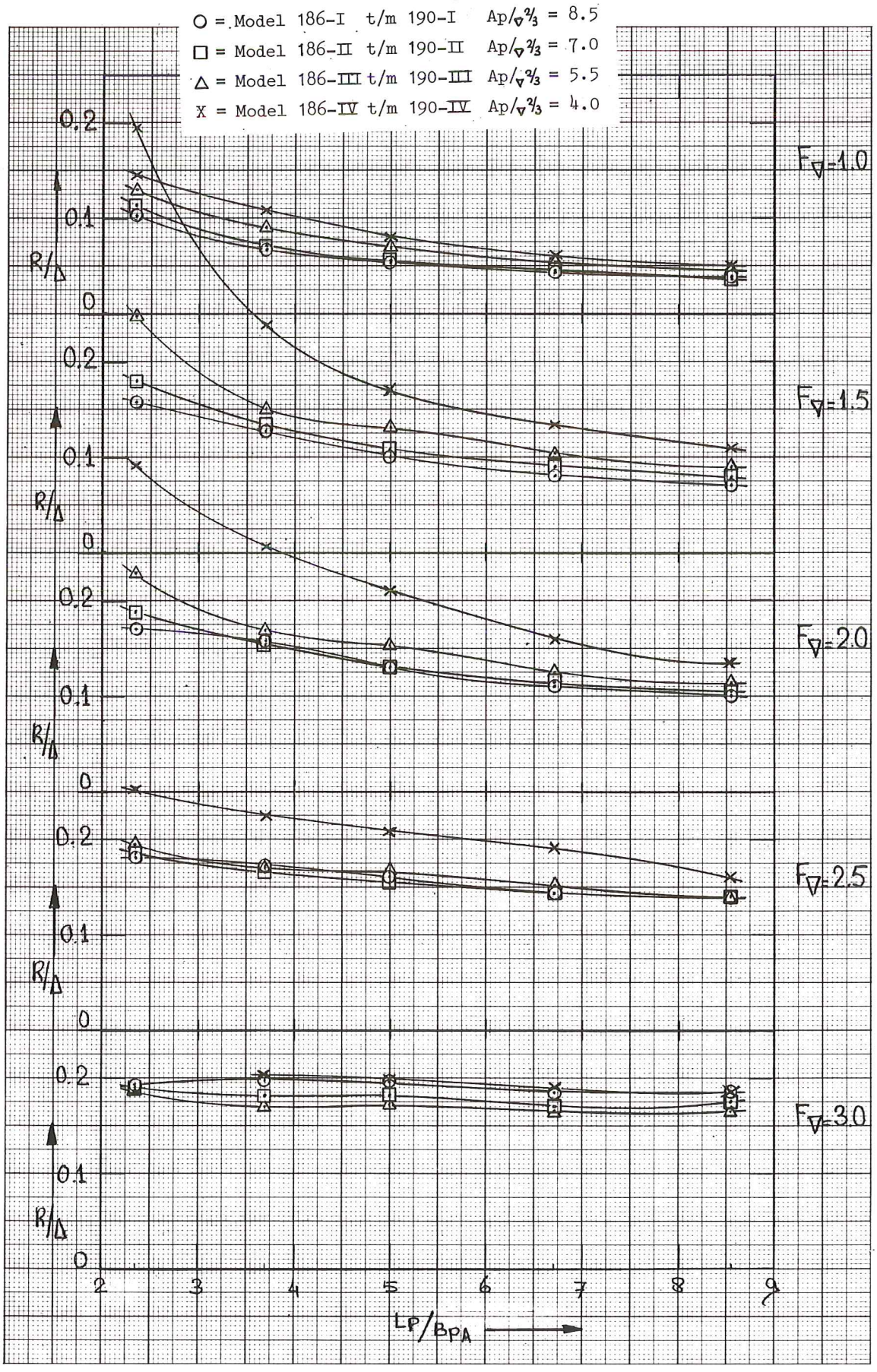

Figure 18: Resistance/weight ratio at 5 different speed coëfficiënts versus length to beam ratio and loading coëfficiënt.

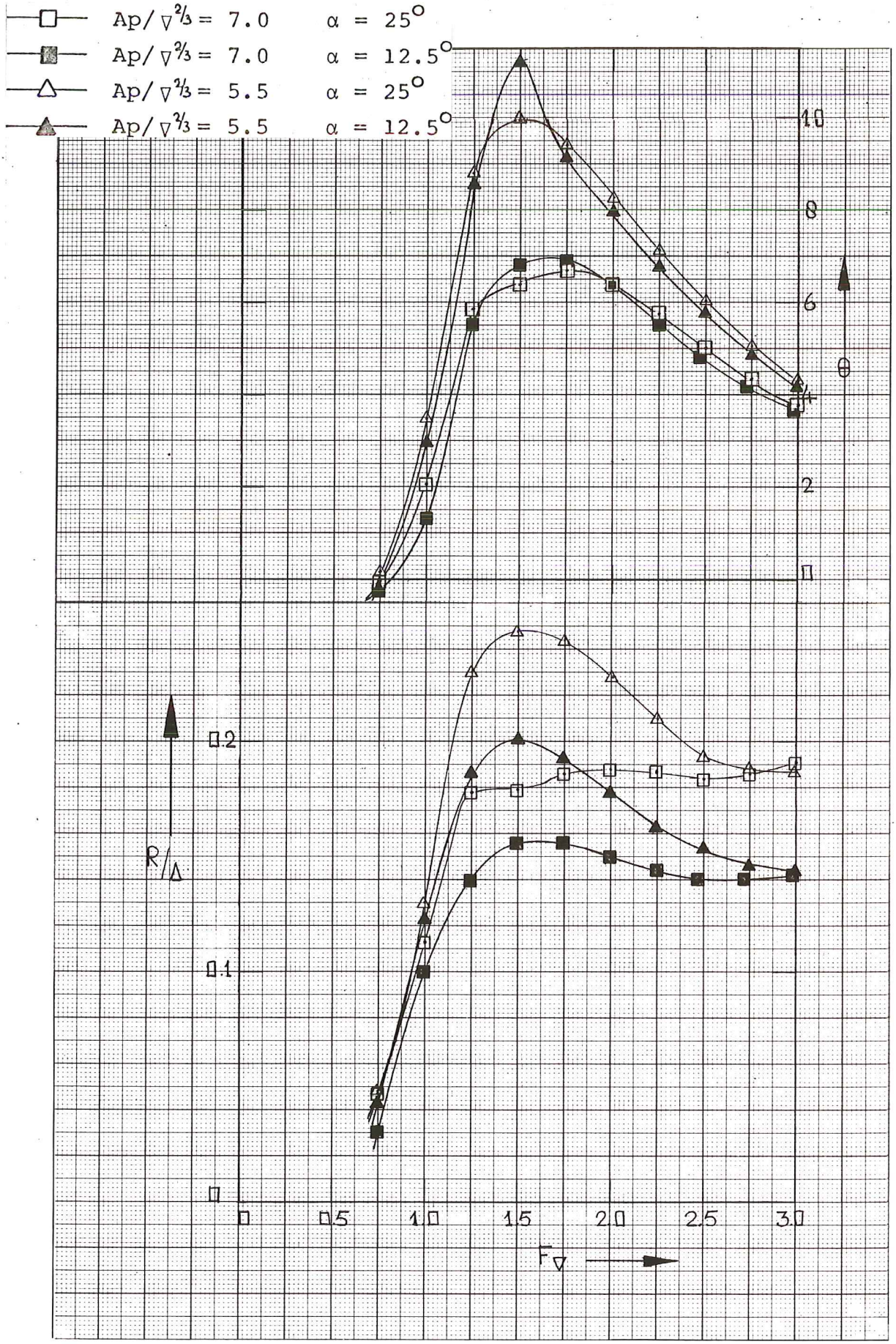

Figure 19: Resistance/weight ratio and angle of attack versus speed coëfficiënt for deadrise angles 12.5° and 25°
Lp/Bpx = 2.0 LCG = 8%.

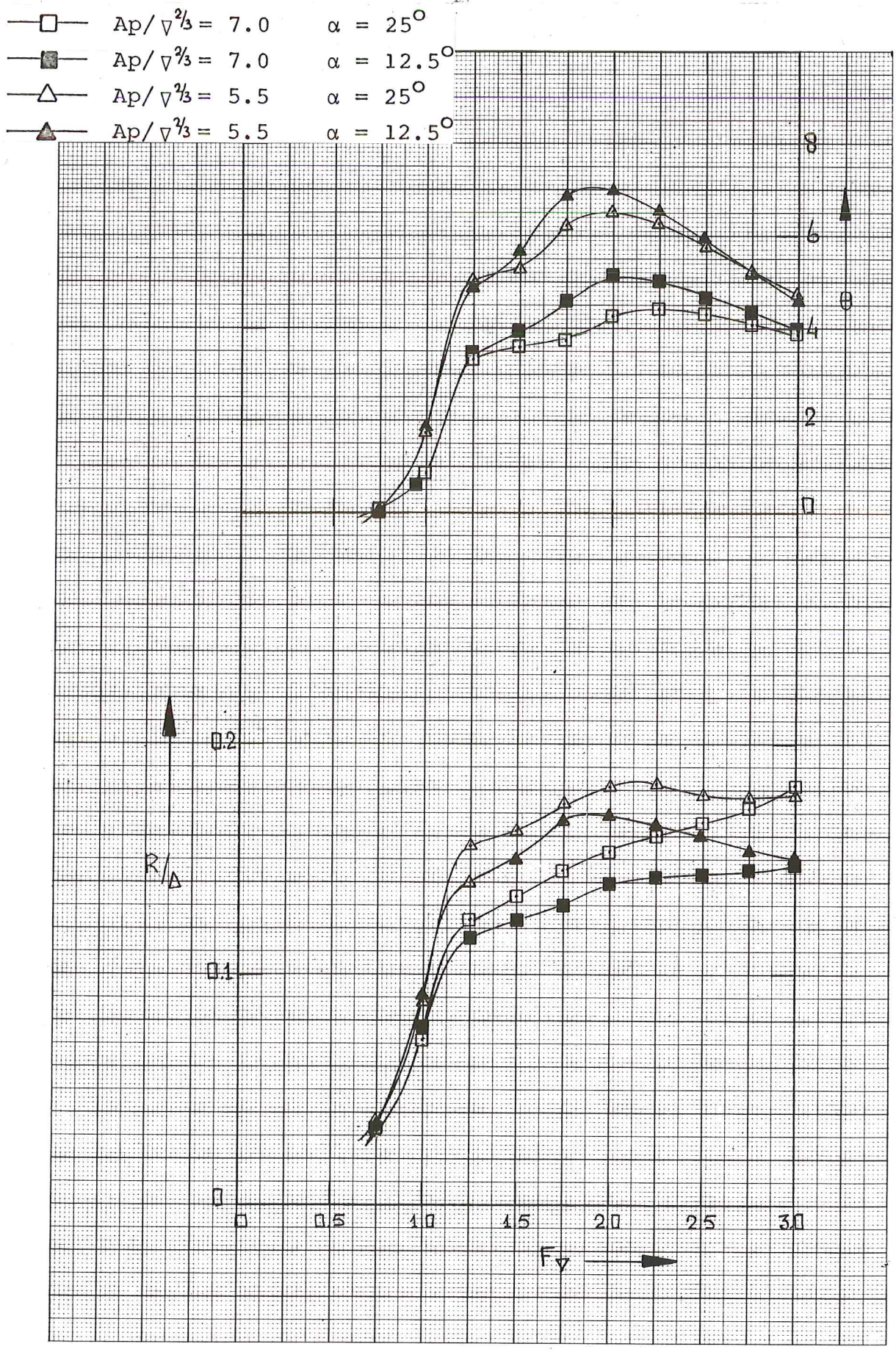

Figure 20: Resistance/weight ratio and angle of attack versus speed coëfficiënt for deadrise angles 12.5° and 25° Lp/Bpx = 3.06 LCG = 8%.

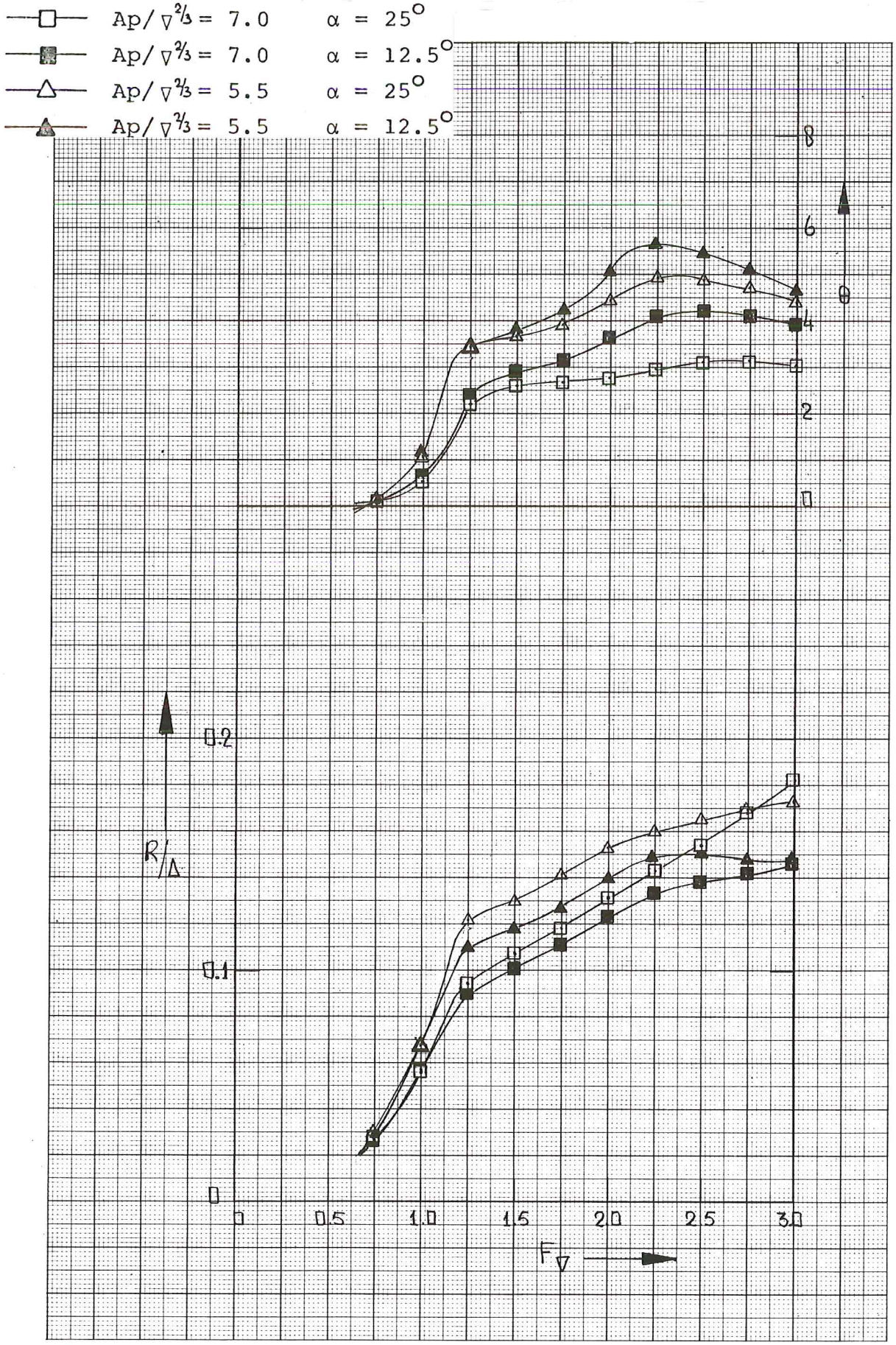

Figure 21: Resistance/weight ratio and angle of attack versus speed coëfficiënt for deadrise angles 12.5° and 25°
Lp/Bpx = 4.09 LCG = 8%.

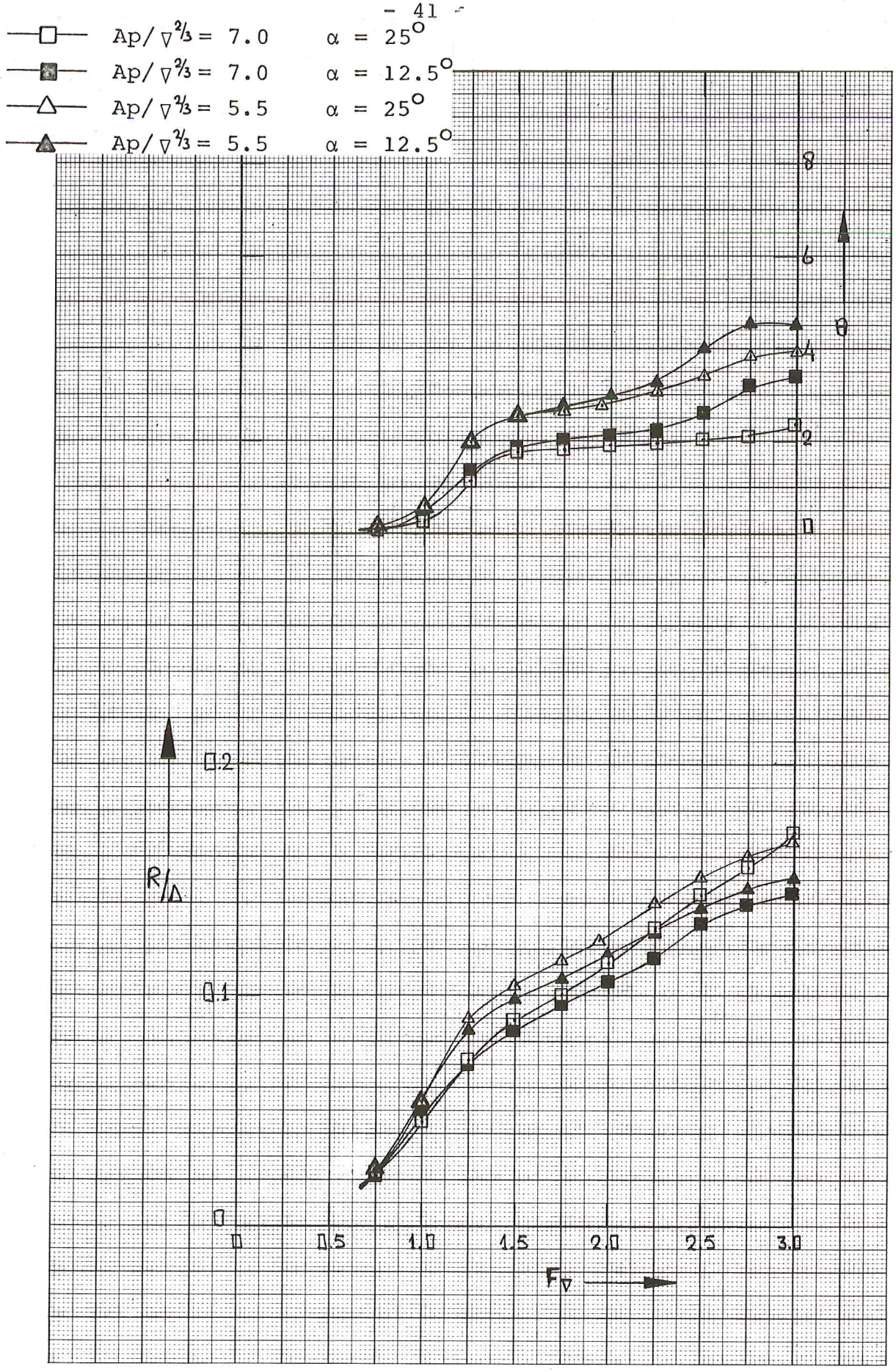

Figure 22: Resistance/weight ratio and angle of attack versus speed coëfficiënt for deadrise angles 12.5° and 25°
Lp/Bpx = 5.09 LCG = 8%.

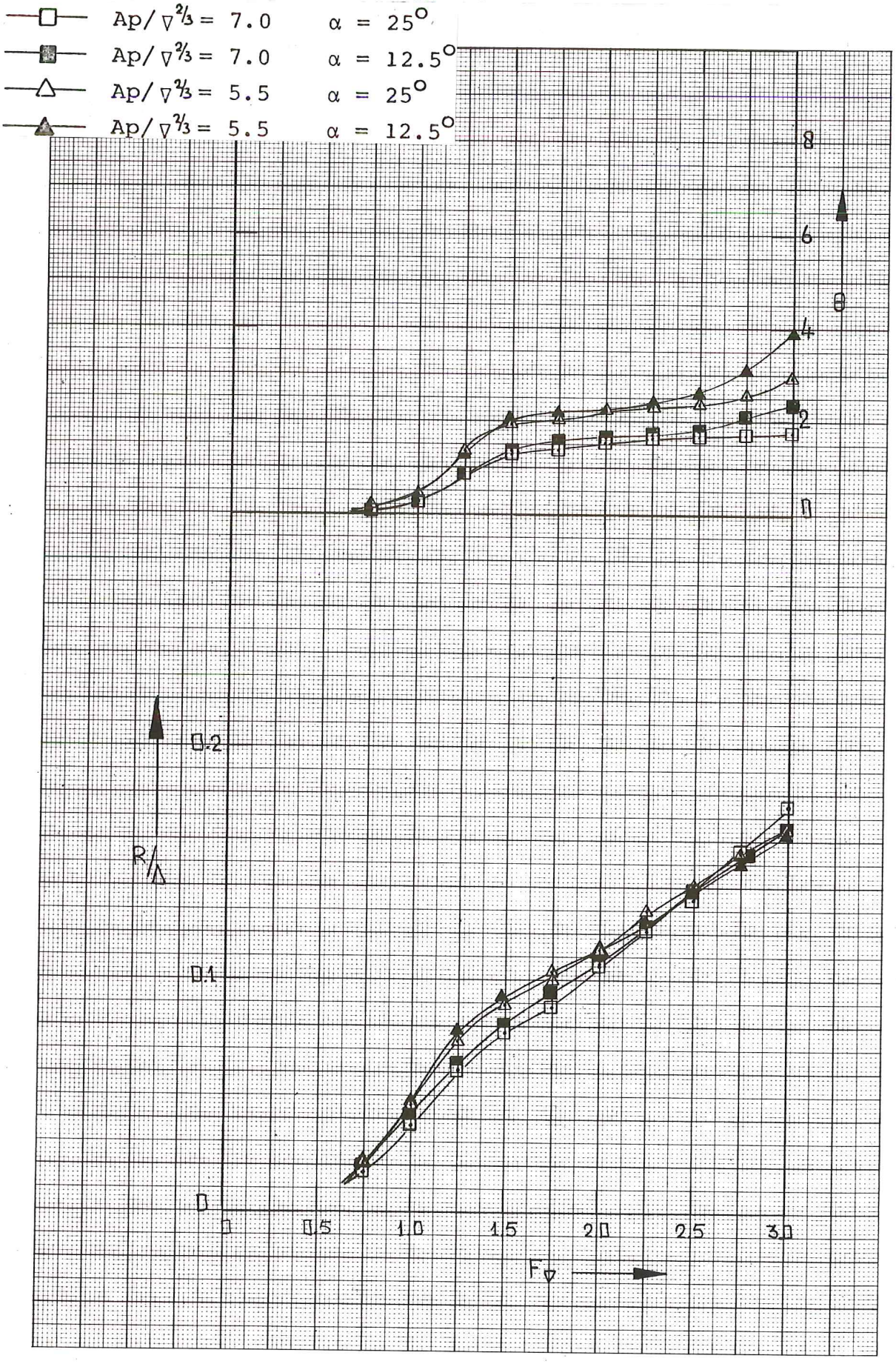

Figure 23: Resistance/weight ratio and angle of attack versus speed coëfficiënt for deadrise angles 12.5° and 25° Lp/Bpx = 7.0 LCG = 8%.

For the higher Froude numbers there is hardly any influence of the L/B ratio on resistance. It may be expected that for higher speeds the tendency may be reversed i.e. the lower L/B ratio hulls have less resistance.
The resistance - weight ratio as plotted in the graphs increases with increasing loading of the hull, i.e. with lower values of $A_p/\nabla^{2/3}$. This influence is most marked at the lower speeds and the lower length-beam ratio's. In general a loading factor lower than 4.0 appears to be highly unfavourable from a resistance point of view.

In general a length to beam ratio of 2.0 appears highly unfavourable. Irrespective of the LCG location the resistance shows a large hump at $Fn_\nabla = 1.5$ with trim angles as high as 15 degrees.
This tendency increases considerably with increasing loading, i.e. decreasing values of the loading coefficient $A_p/\nabla^{2/3}$.
The hump in the resistance curve can be diminished by increasing the length to beam ratio of the boat. With a length to beam ratio of 7.0 this hump is practically non existing.
The hump is also strongly affected by the loading of the craft the lighter the loading the less pronounced is the hump. In most conditions a $A_p/\nabla^{2/3}$ value of 8.5 resulted in a fairly straight resistance curves with no significant hump.

The position of the centre of gravity has a marked effect on resistance, this influence increases with the lower length to beam ratios and higher loading. In general a LCG position between 4 - 8% aft of the centroid of A_p yielded the most favourable resistance characteristics although with increasing speed the centre of gravity can be moved even further aft for less resistance.
In the figures 19 to 23 a comparison is made between the 12.5 and 25 degrees deadrise angle 45.000 N boats.
The figures are arranged in order of increasing length to beam ratio, each figure contains four curves: for two loadings factor values, i.e. $A_p/\nabla^{2/3}$ equal to 7.0 and

5.5, and two deadrise angles, i.e. 12.5 and 25 degrees. Only one LCG position has been considered in casu 8%.

From these figures it is obvious that the 25 degrees deadrise angle boat has more resistance than the original 12.5 degrees deadrise angle boats of the Clement series.
The increase in resistance is highest at the low length to beam ratio boats and decreases considerably with increasing length to beam ratio: with L/B = 2.09 the increment is approximately 20% but with L/B = 7.0 the increment is only 3 - 4%.
This increment in the resistance is independent of the loading coefficient $A_p/\nabla^{2/3}$, since both curves in the figures show generally similar trends.

The rather close ressemblance of the curves for the 12.5 degrees deadrise angle boats and the 25 degrees deadrise angle boats indicates that the character of the resistance curves is rather more determined by the L/B ratio, loading coefficient and LCG position than by the deadrise angle of the planing bottom.

Conclusions.

As shown earlier the seagoing ability of a planing craft can be very much improved by increasing the deadrise angle. In the case of a relatively high length-beam ratio and a high deadrise angle the penalty paid in resistance is small. The experimental data, as presented, allow the analysis of the resistance speed relation for high deadrise angles in actual cases.

Acknowledgement.

The authors wish to express their gratitude to various members of the staff of the Ships Hydromechanics Laboratory of the Delft University of Technology for carrying out the experiments.

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Appendix.

DEL 186
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L/B	DEPL N	LCG M
2.00	111.44	+.000

N	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
	1.117	3.89	1.000	1.000	.502	-.9	-6.5
	1.484	10.58	1.000	1.000	.502	-1.2	-13.7
	1.675	18.02	1.000	1.000	.502	+1.2	-16.2
	1.857	20.19	.655	.970	.442	+3.1	-13.2
	2.231	24.77	.615	.965	.430	+3.5	-5.3
	2.596	29.48	.535	.965	.411	+3.1	-2.1
	2.793	33.13	.495	.960	.397	+3.6	+2.2
	3.358	31.35	.435	.950	.370	+4.5	+12.5

MODEL 186

L/B	DEPL N	LCG M
2.00	111.44	-.040

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
771	1.855	17.63	.595	.955	.416	+3.7	-9.7
772	2.223	19.89	.495	.950	.387	+4.1	-.8
773	2.602	21.12	.435	.940	.360	+4.1	+4.5
774	2.970	20.92	.355	.925	.330	+4.5	+11.7
775	3.353	21.18	.274	.910	.290	+4.7	+20.3

MODEL 186
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L/B	DEPL	LCG
	N	M
2.00	111.44	-.080

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
780	1.116	4.90	1.000	1.000	.502	+.0	-3.4
781	1.482	11.33	1.000	1.000	.502	+1.4	-7.1
790	1.674	16.51	.490	.940	.376	+4.3	-8.1
782	1.856	17.12	.475	.920	.360	+4.5	-4.0
783	2.230	17.51	.415	.905	.334	+4.6	+5.3
784	2.592	17.97	.390	.895	.324	+4.9	+12.1
785	2.971	18.91	.235	.875	.266	+5.0	+19.4
786	3.348	19.79	.195	.870	.253	+4.9	+25.2
787	3.711	20.16	.154	.865	.238	+4.3	+32.8
788	4.087	21.03	.135	.865	.232	+3.7	+35.4
789	4.456	21.48	.115	.865	.223	+3.3	+36.6

MODEL 186

L/B	DEPL	LCG
	N	M
2.00	111.44	-.120

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
755	1.119	5.62	1.000	.945	.502	+.6	-3.7
756	1.481	12.29	.525	.928	.380	+2.7	-7.5
757	1.854	18.61	.440	.880	.333	+5.3	-2.8
767	2.042	19.56	.395	.865	.314	+5.8	+1.0
758	2.236	20.63	.378	.820	.297	+5.9	+8.9
765	2.411	20.11	.350	.795	.281	+5.8	+11.9
759	2.592	19.84	.335	.775	.273	+5.6	+17.4
760	2.970	20.56	.300	.760	.257	+5.1	+24.3
761	3.346	20.76	.270	.745	.244	+4.5	+31.9
762	3.706	20.55	.235	.755	.236	+3.7	+37.1
763	4.104	20.92	.170	.760	.217	+3.0	+39.8
764	4.474	21.65	.140	.760	.208	+2.4	+39.4

MODEL 186

L/B	DEPL N	LCG M
2.00	149.21	+.000

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
803	1.168	5.17	1.000	1.000	.502	-1.3	-8.0
804	1.555	15.37	.860	1.000	.500	-1.2	-18.0
813	1.675	21.55	.800	1.000	.493	+.2	-20.4
805	1.949	31.33	.740	1.000	.490	+4.2	-13.7
806	2.337	35.56	.635	.980	.447	+4.4	-2.4
807	2.723	40.03	.595	.965	.425	+4.5	+1.4
808	3.117	39.49	.565	.950	.404	+5.5	+11.2
809	3.504	36.07	.440	.938	.360	+6.1	+23.2
810	3.895	34.72	.390	.925	.340	+6.1	+30.7
811	4.281	34.73	.325	.920	.317	+5.9	+34.4
812	4.673	36.22	.310	.915	.310	+5.8	+36.3

MODEL 186

L/B	DEPL	LCG
	N	M
2.00	149.21	-.040

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
814	1.167	6.55	1.000	1.000	.502	-.6	-6.6
815	1.554	15.64	.770	.970	.464	+.2	-14.3
824	1.756	25.78	.705	.970	.453	+4.1	-13.5
816	1.948	27.56	.625	.960	.428	+4.8	-9.7
817	2.333	29.03	.525	.955	.399	+5.2	+2.4
818	2.729	28.74	.485	.930	.368	+5.9	+11.2
819	3.118	27.96	.412	.910	.336	+6.2	+21.5
820	3.505	27.95	.360	.900	.317	+6.0	+29.8
821	3.901	27.81	.330	.895	.305	+5.6	+36.8
822	4.288	28.81	.295	.890	.292	+5.2	+39.6
823	4.674	30.74	.265	.890	.281	+4.8	+40.0

MODEL 186

L/B	DEPL	LCG
	N	M
2.00	149.21	-.080

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
825	1.166	7.00	1.000	1.000	.502	+.0	-5.1
826	1.551	16.81	.600	.940	.406	+2.1	-11.2
835	1.756	26.01	.545	.935	.389	+5.5	-9.0
827	1.947	26.56	.525	.925	.377	+5.9	-4.5
828	2.341	26.78	.470	.895	.348	+6.4	+7.5
829	2.727	27.78	.415	.865	.320	+6.7	+18.3
830	3.120	28.00	.375	.835	.300	+6.4	+28.9
831	3.511	27.96	.325	.815	.279	+5.7	+36.4
832	3.898	27.46	.285	.830	.271	+5.0	+42.0
833	4.285	27.80	.205	.835	.247	+4.3	+44.0
834	4.671	28.54	.165	.850	.238	+3.8	+45.3

MODEL 186

L/B	DEPL	LCG
	N	M
2.00	149.21	-.120

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
837	1.167	7.77	1.000	1.000	.502	+.6	-4.0
838	1.553	18.82	.515	.940	.383	+3.6	-8.1
848	1.640	23.06	.500	.940	.380	+4.8	-7.4
847	1.755	30.27	.495	.882	.350	+6.8	-5.8
839	1.949	31.44	.470	.865	.337	+7.2	-.5
849	2.145	33.42	.450	.815	.317	+7.8	+7.1
840	2.344	33.84	.425	.765	.296	+7.9	+15.8
841	2.728	32.63	.375	.725	.271	+7.3	+26.5
842	3.123	31.07	.340	.705	.256	+6.3	+35.8
843	3.512	29.19	.310	.695	.244	+5.3	+44.3
844	3.900	28.60	.270	.700	.233	+4.3	+49.1
845	4.288	28.26	.250	.720	.232	+3.5	+51.6
846	4.676	28.47	.205	.745	.225	+2.8	+51.6

MODEL 186

L/B	DEPL N	LCG M
2.00	214.25	+.000

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
852	1.248	8.12	1.000	1.000	.502	-1.8	-12.7
853	1.656	26.87	.990	1.000	.502	-.4	-26.7
862	1.866	41.56	.960	1.000	.500	+3.2	-25.2
845	2.076	52.78	.900	1.000	.500	+6.2	-15.2
855	2.491	55.20	.740	.970	.460	+6.7	-.1
856	2.900	53.47	.615	.945	.415	+8.0	+13.0
857	3.325	48.22	.522	.930	.380	+8.7	+29.0
858	3.737	45.19	.465	.915	.355	+8.5	+40.0
859	4.026	44.07	.420	.912	.340	+8.1	+45.2
860	4.561	43.53	.382	.910	.328	+7.6	+50.1
861	4.982	44.89	.325	.910	.317	+7.1	+52.9

MODEL 186
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L/B	DEPL	LCG
	N	M
2.00	214.25	-.040

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
863	1.246	9.19	1.000	1.000	.502	-.8	-9.4
864	1.651	25.94	.830	1.000	.500	+1.4	-18.9
872	1.863	42.86	.750	.970	.460	+5.9	-14.7
865	2.074	48.65	.665	.960	.437	+7.3	-6.6
866	2.480	45.91	.575	.925	.391	+8.4	+9.6
867	2.886	45.04	.510	.895	.360	+9.0	+23.5
868	3.334	43.27	.458	.875	.337	+8.6	+37.2
869	3.710	41.65	.420	.865	.322	+8.0	+46.2
870	4.150	40.28	.375	.875	.311	+7.1	+52.5
871	4.555	39.58	.325	.875	.295	+6.4	+54.8
873	4.972	40.15	.295	.750	.253	+5.8	+56.5

MODEL 186

L/B	DEPL	LCG
	N	M
2.00	214.25	-.080

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
874	1.238	10.30	1.000	1.000	.502	+.2	-7.7
875	1.652	27.94	.670	.950	.430	+3.5	-13.1
884	1.862	47.10	.615	.928	.403	+7.9	-9.9
876	2.077	49.27	.575	.900	.380	+8.8	-1.3
877	2.481	53.16	.505	.825	.336	+10.0	+16.4
878	2.898	52.22	.450	.775	.307	+9.4	+31.4
879	3.337	48.90	.403	.755	.287	+8.3	+44.9
880	3.723	44.93	.367	.755	.276	+7.1	+53.4
881	4.142	41.55	.345	.758	.277	+6.0	+58.8
882	4.550	40.22	.310	.775	.259	+5.1	+61.2
883	4.965	40.05	.280	.795	.260	+4.3	+62.9

MODEL 186

L/B	DEPL	LCG
	N	M
2.00	214.25	-.120

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
885	1.247	11.96	1.000	1.000	.502	+1.1	-6.8
886	1.651	32.61	.625	.930	.407	+5.6	-9.4
895	1.846	55.26	.565	.855	.362	+9.2	-7.7
887	2.064	67.34	.535	.780	.332	+11.3	-1.7
888	2.481	68.36	.470	.705	.293	+11.4	+22.3
889	2.895	62.29	.405	.660	.262	+10.0	+39.7
890	3.317	55.02	.360	.650	.247	+8.1	+52.3
891	3.721	49.70	.335	.650	.240	+6.5	+61.1
892	4.151	44.98	.300	.655	.230	+5.0	+67.1
893	4.555	42.21	.270	.660	.223	+3.9	+68.3
894	4.965	41.61	.245	.695	.224	+3.0	+69.7

MODEL 186

L/B	DEPL	LCG
	N	M
2.00	345.41	+.000

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
898	1.346	15.63	1.000	1.000	.502	-2.2	-20.4
899	1.781	51.85	1.000	1.000	.502	+1.4	-36.4
908	2.016	85.74	.990	1.000	.502	+6.2	-33.0
900	2.246	108.04	.960	1.000	.502	+9.5	-19.7
901	2.690	114.80	.775	.975	.467	+13.3	+7.2
902	3.141	105.75	.645	.905	.402	+13.5	+28.2
903	3.587	95.90	.575	.875	.371	+13.5	+54.8
904	4.052	86.83	.530	.875	.359	+12.4	+71.0
905	4.487	80.68	.500	.875	.350	+11.3	+80.0
906	4.939	75.93	.465	.875	.340	+10.2	+82.5
907	5.184	74.74	.442	.875	.331	+9.9	+85.7

MODEL 186
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L/B	DEPL N	LCG M
2.00	345.41	-.040

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
912	1.350	17.34	1.000	1.000	.502	-.8	-17.3
913	1.784	52.27	.960	1.000	.502	+3.5	-27.0
916	2.025	103.95	.870	.990	.491	+10.0	-21.3
914	2.250	115.78	.775	.955	.457	+12.5	-5.2
915	2.686	121.12	.645	.885	.394	+14.9	+19.3
917	3.135	113.70	.570	.820	.354	+14.2	+41.0
918	3.582	101.87	.520	.800	.334	+12.4	+59.9
919	4.043	90.06	.485	.795	.321	+11.1	+77.4
920	4.482	81.46	.435	.795	.307	+9.6	+85.5
921	4.938	75.03	.405	.805	.300	+8.4	+89.0
922	5.183	73.21	.390	.805	.296	+7.4	+90.0

MODEL 186

L/B	DEPL	LCG
	N	M
2.00	345.41	-.080

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
923	1.348	19.66	1.000	1.000	.502	+.7	-13.1
924	1.783	58.55	.775	1.000	.500	+6.2	-16.9
933	2.015	114.47	.710	.940	.434	+12.3	-12.4
926	2.237	133.12	.665	.855	.390	+13.8	-.7
927	2.693	152.24	.570	.755	.336	+16.4	+27.6
929	3.135	136.47	.500	.690	.298	+14.3	+56.0
928	3.586	117.69	.455	.680	.281	+11.6	+75.0
930	4.016	100.74	.430	.685	.276	+9.8	+90.2
931	4.487	87.33	.400	.695	.270	+7.8	+97.5

MODEL 187
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L/B	DEPL N	LCG M
3.06	343.06	-.150

RUN	VM M/S	RTM N	LK M	LC M	S M2
638	1.346	15.00	1.250	1.250	.442
639	1.791	44.46	1.003	1.172	.407
640	2.233	84.94	.833	1.073	.352
641	2.680	106.48	.723	.923	.298
642	3.120	116.36	.660	.820	.264
643	3.590	106.26	.628	.783	.250
644	4.042	94.35	.568	.778	.236
645	4.445	86.76	.533	.763	.226
646	4.957	78.65	.503	.763	.220
647	5.179	76.59	.488	.763	.217

MODEL 187

L/B	DEPL	LCG
	N	M
3.06	343.06	-.100

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
648	1.348	14.08	1.250	1.250	.442	+.1	-8.8
649	1.795	37.55	1.155	1.228	.437	+3.4	-14.6
658	2.012	63.86	1.010	1.200	.420	+6.1	-13.3
650	2.236	73.97	.943	1.158	.394	+7.5	-7.5
651	2.684	81.48	.843	1.098	.360	+9.1	+5.5
652	3.130	91.71	.743	.983	.315	+10.7	+24.2
653	3.587	88.20	.683	.923	.290	+10.2	+42.5
654	4.043	81.86	.633	.888	.272	+8.8	+54.9
655	4.480	77.04	.598	.888	.263	+7.9	+63.6
656	4.930	72.38	.568	.888	.258	+7.1	+70.2
657	5.185	69.58	.548	.886	.253	+6.7	+73.4

MODEL 187

L/B	DEPL	LCG
	N	M
3.06	343.06	-.050

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
659	1.346	12.42	1.250	1.250	.442	-.6	-10.3
660	1.793	35.36	1.250	1.250	.442	+2.2	-18.7
669	2.015	55.49	1.250	1.250	.442	+5.1	-16.1
661	2.234	68.26	1.123	1.203	.429	+6.4	-11.2
662	2.682	74.10	1.003	1.178	.409	+7.2	-.1
663	3.140	78.56	.853	1.113	.366	+9.4	+16.3
664	3.592	78.98	.773	1.068	.338	+10.1	+34.4
665	4.044	72.56	.708	1.030	.317	+9.5	+49.3
666	4.479	69.46	.683	1.013	.303	+8.9	+57.3
667	4.924	67.65	.628	1.008	.290	+8.1	+63.9
668	5.200	66.23	.608	1.011	.290	+7.7	+66.8

MODEL 187

L/B	DEPL	LCG
	N	M
3.06	343.06	+.000

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
670	1.349	12.05	1.250	1.250	.442	-1.1	-12.0
671	1.793	35.39	1.250	1.250	.442	+.9	-24.1
682	2.010	52.81	1.230	1.240	.442	+3.8	-22.3
672	2.238	62.68	1.220	1.240	.441	+5.5	-15.7
683	2.459	64.56	1.200	1.230	.441	+5.1	-11.0
684	2.681	68.63	1.180	1.220	.438	+4.6	-10.0
674	3.141	82.56	1.100	1.200	.426	+4.1	-8.6
675	3.589	106.15	.960	1.150	.395	+4.1	-10.8
681	3.927	76.18	.828	1.128	.365	+9.8	+38.1
676	4.049	74.00	.813	1.118	.359	+9.7	+42.8
677	4.477	71.00	.753	1.098	.340	+9.4	+52.0
678	4.939	68.81	.703	1.096	.330	+8.7	+59.4
679	5.206	67.40	.683	.998	.304	+8.5	+61.4

MODEL 187

L/B	DEPL N	LCG M
3.06	212.78	-.150

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
715	1.238	8.31	1.250	1.250	.442	+.5	-4.6
716	1.650	18.97	1.250	1.250	.442	+2.5	-9.9
719	1.855	29.27	1.250	1.250	.442	+4.4	-9.6
717	2.065	35.08	.753	1.103	.341	+5.6	-6.1
718	2.472	37.70	.693	1.043	.316	+6.3	+3.9
720	2.900	41.55	.618	.948	.281	+7.1	+14.7
721	3.307	42.09	.566	.888	.258	+6.9	+27.5
722	3.723	40.51	.533	.863	.245	+6.2	+38.7
723	4.139	39.17	.488	.853	.234	+5.5	+45.3
724	4.539	37.94	.453	.863	.227	+4.6	+48.6
725	4.983	37.45	.428	.863	.222	+4.0	+49.7

MODEL 187

L/B	DEPL	LCG
	N	M
3.06	212.78	-.100

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
612	1.245	7.81	1.250	1.250	.442	+.1	-5.3
613	1.652	18.62	1.103	1.228	.434	+1.8	-10.7
614	2.072	33.24	.873	1.166	.384	+5.0	-9.5
615	2.480	34.48	.793	1.133	.360	+5.3	+.6
616	2.895	37.05	.713	1.098	.332	+6.2	+8.5
617	3.312	38.47	.663	1.058	.312	+6.5	+19.2
710	3.715	35.90	.613	1.023	.294	+6.2	+29.6
711	4.118	36.17	.568	1.008	.281	+5.8	+37.5
712	4.545	35.93	.528	1.003	.271	+5.3	+39.6
713	4.956	36.38	.468	1.013	.260	+4.8	+42.9

MODEL 187
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L/B	DEPL	LCG
	N	M
3.06	212.78	-.050

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
601	1.247	6.97	1.250	1.250	.442	-.3	-6.5
602	1.653	18.28	1.250	1.250	.442	+1.0	-12.6
603	2.066	31.32	1.033	1.203	.420	+4.4	-9.8
604	2.482	33.66	.943	1.188	.404	+4.6	-1.8
695	2.899	34.73	.833	1.166	.371	+4.8	+5.8
696	3.306	35.44	.738	1.140	.350	+5.6	+15.4
697	3.718	35.17	.673	1.033	.310	+5.9	+24.1
698	4.150	35.23	.628	1.098	.313	+5.8	+29.6
699	4.550	35.81	.598	1.093	.306	+5.6	+34.0
700	4.971	37.14	.553	1.088	.295	+5.4	+37.1

MODEL 187

L/B	DEPL	LCG
	N	M
3.06	212.78	+.000

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
589	1.246	6.59	1.250	1.250	.442	-.7	-7.6
590	1.652	19.38	1.250	1.250	.442	-.3	-16.3
600	1.865	25.61	1.250	1.250	.442	+2.0	-17.4
591	2.072	32.83	1.250	1.250	.442	+3.7	-13.6
592	2.478	38.31	1.250	1.250	.442	+3.7	-5.7
689	2.894	42.79	1.083	1.213	.427	+4.2	-.1
688	3.308	44.62	.943	1.193	.405	+4.9	+8.2
687	3.721	43.31	.813	1.168	.374	+5.6	+18.6
686	4.150	42.48	.753	1.168	.363	+5.7	+26.1
690	4.555	43.13	.663	1.138	.333	+5.8	+29.7
691	4.969	44.49	.623	1.128	.320	+5.8	+34.3

MODEL 187

L/B	DEPL N	LCG M
3.06	148.23	-.150

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
553	1.164	5.54	.953	1.183	.403	+.5	-3.2
554	1.559	11.60	.903	1.173	.391	+1.7	-7.2
555	1.754	17.34	.733	1.143	.350	+3.1	-8.8
552	1.943	20.55	.700	1.130	.338	+4.1	-7.4
551	2.340	21.54	.643	1.083	.314	+4.4	+2.7
550	2.728	23.77	.583	1.033	.290	+4.9	+8.6
549	3.130	24.76	.543	.968	.268	+5.1	+17.9
548	3.499	25.37	.503	.948	.255	+4.9	+25.6
547	3.893	25.95	.483	.938	.249	+4.4	+32.2
546	4.282	25.85	.403	.928	.229	+3.9	+34.8
545	4.665	26.48	.303	.913	.202	+3.4	+35.9

MODEL 187

L/B	DEPL	LCG
	N	M
3.06	148.23	-.100

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
556	1.165	5.10	1.250	1.250	.442	+.1	-4.0
557	1.552	10.73	1.003	1.213	.420	+.8	-7.9
566	1.755	15.39	.903	1.183	.396	+2.3	-9.4
558	1.946	18.44	.783	1.173	.370	+3.3	-8.5
559	2.338	19.87	.683	1.153	.343	+3.6	-.7
560	2.724	21.54	.663	1.133	.331	+3.7	+4.4
561	3.116	22.84	.623	1.108	.315	+4.3	+10.5
562	3.496	23.69	.583	1.093	.382	+4.4	+17.7
563	3.895	24.54	.543	1.078	.290	+4.3	+24.0
564	4.280	25.52	.503	1.063	.279	+4.1	+26.4
565	4.664	27.04	.463	1.048	.265	+3.9	+29.2

MODEL 187

L/B	DEPL N	LCG M
3.06	148.23	-.050

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
567	1.165	4.58	1.250	1.250	.442	-.2	-4.2
568	1.550	11.03	1.153	1.250	.441	+.3	-8.3
577	1.752	14.65	1.083	1.228	.432	+1.5	-9.9
569	1.947	18.40	.923	1.203	.407	+2.8	-10.0
570	2.337	20.54	.843	1.183	.385	+3.2	-2.4
571	2.725	23.03	.783	1.173	.370	+3.2	+1.4
572	3.117	25.28	.723	1.168	.357	+3.5	+6.7
573	3.500	26.10	.653	1.153	.336	+3.9	+13.0
574	3.893	26.72	.603	1.138	.320	+4.1	+19.5
575	4.285	27.42	.573	1.123	.309	+4.2	+22.3
576	4.668	28.40	.533	1.103	.294	+4.1	+24.9

MODEL 187

L/B	DEPL N	LCG M
3.06	148.23	+.000

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
587	1.164	4.35	1.250	1.250	.442	-.5	-5.2
586	1.561	11.24	1.250	1.250	.442	-.6	-10.5
588	1.753	16.30	1.250	1.250	.442	+1.0	-12.0
585	1.945	20.08	1.250	1.250	.442	+2.3	-11.8
584	2.335	23.38	1.143	1.213	.433	+2.8	-4.6
583	2.723	27.63	1.023	1.213	.421	+2.8	-1.7
582	3.125	31.49	.883	1.203	.400	+3.1	+3.4
581	3.503	34.07	.803	1.188	.380	+3.4	+8.5
580	3.890	35.41	.743	1.177	.364	+3.7	+14.5
579	4.284	35.83	.683	1.168	.349	+4.1	+17.4
578	4.673	36.16	.583	1.153	.322	+4.3	+20.5

MODEL 187

L/B	DEPL	LCG
	N	M
3.06	110.76	-.150

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
534	1.115	3.90	.953	1.168	.398	+.4	-2.6
535	1.482	7.81	.853	1.163	.380	+1.1	-5.6
544	1.664	11.94	.753	1.148	.356	+2.5	-8.1
536	1.856	12.66	.653	1.138	.331	+2.8	-6.2
537	2.224	14.26	.603	1.113	.311	+3.2	+.4
538	2.594	15.30	.503	1.101	.288	+3.1	+4.0
539	2.960	16.85	.473	1.098	.280	+3.4	+9.2
540	3.333	17.94	.453	1.063	.265	+3.6	+15.7
541	3.703	18.93	.443	1.013	.254	+3.4	+22.0
542	4.078	19.60	.403	.953	.234	+3.1	+24.3
543	4.445	20.38	.353	.943	.220	+2.9	+26.1

MODEL 187

L/B	DEPL	LCG
	N	M
3.06	110.76	-.100

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
523	1.117	3.82	1.250	1.250	.442	+.1	-2.5
524	1.484	7.42	.903	1.193	.400	+.5	-5.3
533	1.660	10.54	.803	1.183	.378	+1.7	-7.9
525	1.859	12.31	.763	1.173	.366	+2.4	-7.5
526	2.225	14.03	.683	1.153	.343	+2.7	-1.6
527	2.597	15.42	.603	1.143	.322	+2.7	+1.9
528	2.964	17.05	.583	1.133	.314	+2.8	+6.0
529	3.337	18.17	.553	1.113	.303	+3.1	+11.6
530	3.706	19.18	.503	1.113	.290	+3.2	+16.9
531	4.079	20.36	.453	1.100	.274	+3.1	+20.5
532	4.450	21.96	.403	1.103	.261	+3.0	+20.3

MODEL 187
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L/B	DEPL	LCG
	N	M
3.06	110.76	-.050

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
499	1.028	3.37	1.250	1.250	.442	-.1	-3.5
500	1.483	7.32	1.250	1.250	.442	+.1	-6.3
509	1.676	10.56	.963	1.200	.410	+1.2	-7.8
501	1.857	11.94	.913	1.187	.398	+1.9	-8.4
502	2.228	14.21	.763	1.173	.366	+2.5	-3.3
503	2.597	16.80	.683	1.169	.349	+2.4	-.6
504	2.964	18.89	.643	1.169	.340	+2.5	+2.1
506	3.333	21.17	.613	1.173	.336	+2.6	+7.2
505	3.778	22.66	.573	1.148	.320	+2.9	+13.2
507	4.078	24.00	.543	1.133	.304	+3.0	+15.3
508	4.447	25.03	.523	1.113	.295	+3.1	+17.1

MODEL 187

L/B	DEPL	LCG
	N	M
3.06	110.76	+.000

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
512	1.116	2.92	1.250	1.250	.442	-.3	-3.8
513	1.484	8.01	1.250	1.250	.442	-.4	-7.5
522	1.677	11.41	1.250	1.250	.442	+.6	-9.1
514	1.858	13.04	1.043	1.225	.428	+1.5	-9.6
515	2.229	16.02	.883	1.203	.400	+2.3	-5.0
516	2.596	19.22	.803	1.193	.382	+2.3	-2.6
517	2.960	23.12	.753	1.188	.370	+2.3	-.6
518	3.336	26.99	.703	1.183	.359	+2.4	+3.3
519	3.705	29.78	.653	1.183	.350	+2.5	+7.8
520	4.080	32.22	.633	1.183	.345	+2.7	+10.3

MODEL 188

L/B	DEPL	LCG
	N	M
4.09	370.13	+.000

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
448	1.255	7.94	1.500	1.500	.521	-.5	-7.4
449	1.672	22.93	1.500	1.500	.521	-.3	-16.3
451	1.972	36.98	1.500	1.500	.521	+2.0	-21.3
457	2.093	44.16	1.500	1.500	.521	+3.0	-20.9
450	2.264	50.64	1.500	1.500	.521	+4.1	-19.4
456	2.358	51.68	1.500	1.500	.521	+4.1	-17.0
455	2.489	53.10	1.500	1.500	.521	+3.9	-15.7
452	2.723	55.75	1.500	1.500	.521	+3.8	-13.2
453	3.177	66.58	1.500	1.500	.521	+3.0	-10.4
454	3.629	82.43	1.500	1.500	.521	+2.1	-12.4

MODEL 188

L/B	DEPL	LCG
	N	M
4.09	370.13	-.060

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
458	1.359	12.30	1.500	1.500	.521	-.2	-8.1
459	1.815	27.82	1.500	1.500	.521	+1.3	-16.7
468	2.043	40.95	1.500	1.500	.521	+3.1	-19.0
460	2.266	53.92	1.442	1.492	.520	+4.5	-15.5
461	2.722	60.37	1.387	1.477	.515	+4.8	-7.7
462	3.178	66.51	1.302	1.457	.504	+5.4	+.1
463	3.622	70.65	1.152	1.409	.472	+6.8	+12.0
464	4.083	71.70	1.050	1.365	.433	+7.4	+23.4
465	4.537	70.29	.962	1.327	.413	+7.5	+37.1
466	5.064	67.72	.907	1.287	.390	+7.0	+46.6
467	5.131	66.72	.892	1.292	.390	+6.9	+47.0

MODEL 188

L/B	DEPL	LCG
	N	M
4.09	370.13	-.120

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
469	1.357	12.31	1.500	1.500	.521	+.5	-4.4
470	1.814	29.12	1.500	1.500	.521	+2.1	-15.7
477	2.055	46.42	1.347	1.467	.509	+4.0	-15.8
471	2.266	58.57	1.272	1.440	.496	+5.0	-13.9
472	2.721	62.94	1.172	1.412	.476	+5.7	-5.4
473	3.172	69.64	1.067	1.357	.442	+6.9	+5.3
474	3.630	77.80	.957	1.239	.392	+8.4	+19.8
475	4.085	76.11	.882	1.172	.362	+8.3	+37.5
476	4.539	77.03	.842	1.132	.346	+7.5	+48.4
478	4.970	73.89	.777	1.127	.330	+6.9	+55.4
479	5.079	73.29	.799	1.122	.334	+6.7	+56.3

MODEL 188

L/B	DEPL N	LCG M
4.09	370.13	-.180

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
733	1.359	13.67	1.500	1.500	.521	+.6	-6.1
734	1.816	34.14	1.252	1.332	.468	+3.0	-13.2
735	2.268	66.03	1.092	1.367	.449	+5.6	-9.1
736	2.727	76.45	1.012	1.282	.410	+6.9	-2.2
737	3.178	91.54	.902	1.132	.359	+8.8	+11.6
738	3.621	98.22	.822	1.032	.321	+9.6	+31.3
739	4.090	92.54	.772	.992	.302	+8.6	+48.4
740	4.519	86.39	.732	.977	.290	+7.6	+60.3
741	4.981	81.55	.702	.962	.280	+6.6	+66.7
742	5.186	78.40	.687	.962	.278	+6.1	+68.9

MODEL 188

L/B	DEPL	LCG
	N	M
4.09	229.55	+.000

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
437	1.257	6.19	1.500	1.500	.521	-.4	-5.4
438	1.674	15.17	1.500	1.500	.521	-.3	-11.1
447	1.883	20.33	1.500	1.500	.521	+.9	-14.8
439	2.094	25.32	1.500	1.500	.521	+2.4	-13.5
440	2.512	30.20	1.470	1.500	.521	+2.7	-8.0
441	2.928	36.25	1.467	1.500	.521	+2.6	-4.8
442	3.352	43.39	1.442	1.499	.520	+2.7	-.8
444	3.766	47.61	1.312	1.474	.508	+3.4	+6.0
443	4.186	47.53	1.172	1.457	.490	+4.0	+12.8
445	4.602	47.25	1.067	1.432	.466	+4.5	+17.3
446	5.035	47.76	.992	1.417	.447	+4.7	+21.3

MODEL 188

L/B	DEPL	LCG
	N	M
4.09	229.55	-.060

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
425	1.255	6.33	1.500	1.500	.521	-.1	-4.8
426	1.673	14.68	1.500	1.500	.521	+.4	-9.8
435	1.886	20.56	1.472	1.500	.521	+1.6	-12.3
427	2.092	26.49	1.372	1.482	.515	+3.0	-12.1
428	2.510	29.20	1.282	1.467	.504	+3.2	-5.9
429	2.933	33.00	1.202	1.457	.498	+3.4	-.9
430	3.351	35.93	1.117	1.442	.478	+3.7	+6.1
431	3.772	37.64	1.039	1.419	.457	+4.2	+12.5
432	4.185	38.24	.957	1.397	.433	+4.6	+19.5
433	4.608	39.34	.892	1.377	.413	+4.7	+22.8
434	5.020	40.23	.852	1.367	.401	+4.6	+27.0

MODEL 188

L/B	DEPL	LCG
	N	M
4.09	229.55	-.120

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
414	1.256	6.65	1.427	1.487	.520	+.1	-4.0
415	1.674	15.60	1.377	1.477	.515	+1.1	-9.0
424	1.887	22.47	1.300	1.460	.504	+2.3	-11.3
416	2.093	27.99	1.172	1.437	.483	+3.5	-10.8
417	2.513	29.91	1.092	1.417	.465	+3.7	-4.4
418	2.929	32.43	1.032	1.402	.449	+3.9	+1.4
419	3.350	35.14	.952	1.362	.420	+4.5	+9.9
420	3.773	36.79	.892	1.352	.405	+4.9	+18.0
421	4.187	37.94	.832	1.294	.378	+4.9	+24.7
422	4.610	38.74	.782	1.277	.363	+4.7	+29.9
423	5.023	39.62	.752	1.267	.354	+4.4	+33.1

MODEL 188

L/B	DEPL N	LCG M
4.09	229.55	-.180

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
403	1.185	5.73	1.332	1.442	.503	+.3	-2.9
404	1.573	12.61	1.192	1.437	.485	+1.1	-7.5
413	1.834	23.10	1.080	1.415	.462	+2.7	-11.5
405	2.094	31.52	1.022	1.382	.440	+4.1	-10.6
406	2.512	33.49	.952	1.362	.420	+4.3	-3.1
407	2.929	37.24	.902	1.302	.394	+4.9	+3.7
408	3.350	40.70	.827	1.197	.356	+5.7	+13.3
409	3.766	41.66	.772	1.132	.330	+5.5	+22.7
410	4.196	42.04	.722	1.092	.311	+4.7	+29.2
411	4.602	41.74	.692	1.074	.301	+4.2	+33.6
412	5.040	40.62	.652	1.057	.290	+3.7	+38.4

MODEL 188

L/B	DEPL	LCG
	N	M
4.09	159.90	-.180

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
393	1.184	4.59	1.082	1.437	.470	+.3	-2.7
394	1.569	9.86	1.032	1.427	.459	+1.0	-6.4
395	1.975	16.83	.932	1.397	.428	+2.7	-9.1
396	2.366	19.00	.852	1.372	.403	+3.0	-2.9
397	2.760	20.60	.842	1.359	.397	+3.1	+1.3
398	3.157	22.74	.792	1.332	.378	+3.4	+6.9
399	3.555	24.56	.752	1.287	.358	+3.7	+13.7
400	3.942	25.24	.702	1.252	.338	+3.6	+20.0
401	4.330	26.27	.647	1.217	.318	+3.4	+23.6
402	4.735	27.35	.632	1.192	.310	+3.1	+25.5

MODEL 188

L/B	DEPL N	LCG M
4.09	159.90	-.120

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
383	1.186	4.47	1.272	1.472	.505	+.1	-2.7
384	1.573	9.02	1.252	1.472	.504	+.5	-5.6
385	1.978	15.07	1.052	1.437	.465	+2.2	-9.1
386	2.369	17.17	.972	1.417	.443	+2.6	-3.7
387	2.757	18.93	.912	1.412	.430	+2.7	-.3
388	3.155	21.00	.882	1.402	.420	+2.8	+4.4
389	3.550	22.88	.862	1.382	.408	+3.0	+10.5
390	3.945	24.60	.802	1.362	.389	+3.1	+14.6
391	4.333	26.87	.752	1.352	.379	+3.2	+17.8
392	4.738	29.10	.712	1.342	.360	+3.0	+18.8

MODEL 188

L/B	DEPL N	LCG M
4.09	159.90	-.060

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
372	1.186	4.29	1.442	1.499	.520	-.1	-3.4
373	1.573	9.17	1.432	1.497	.520	+.1	-6.5
374	1.978	15.18	1.272	1.472	.505	+1.8	-9.4
375	2.369	17.58	1.142	1.457	.487	+2.3	-5.3
380	2.756	20.39	1.092	1.447	.476	+2.4	-2.4
376	3.153	23.11	1.037	1.439	.465	+2.4	+2.6
377	3.545	25.69	.992	1.432	.455	+2.5	+7.7
378	3.944	28.00	.922	1.427	.440	+2.6	+11.7
379	4.330	29.95	.882	1.412	.424	+2.8	+12.9
381	4.735	31.42	.812	1.404	.406	+3.0	+14.7

MODEL 188

L/B	DEPL	LCG
	N	M
4.09	159.90	+.000

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
360	1.184	4.16	1.500	1.500	.521	-.3	-3.7
361	1.571	9.24	1.500	1.500	.521	-.4	-7.0
371	1.776	12.61	1.500	1.500	.521	+.4	-9.0
362	1.974	15.88	1.462	1.497	.520	+1.4	-10.1
363	2.366	19.24	1.357	1.482	.515	+1.9	-6.3
364	2.760	23.20	1.332	1.477	.510	+2.0	-4.3
365	3.158	27.78	1.297	1.474	.507	+2.1	-1.0
366	3.549	31.53	1.230	1.468	.501	+2.4	+4.4
367	3.947	35.16	1.162	1.462	.490	+2.3	+7.8
368	4.399	37.56	1.092	1.452	.479	+2.4	+9.2
369	4.730	40.81	1.012	1.442	.462	+2.7	+10.7

MODEL 188

L/B	DEPL N	LCG M
4.09	119.49	+.000

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
348	1.124	2.85	1.442	1.497	.520	-.2	-2.7
349	1.502	6.64	1.457	1.499	.520	-.2	-4.9
350	1.876	10.52	1.392	1.490	.519	+.6	-7.6
351	2.256	13.32	1.259	1.472	.505	+1.5	-5.5
352	2.624	16.04	1.207	1.467	.498	+1.5	-3.8
353	3.001	19.43	1.142	1.462	.489	+1.7	-1.5
354	3.371	23.29	1.095	1.459	.482	+1.6	+2.0
355	3.754	27.29	1.067	1.456	.477	+1.6	+5.0
356	4.136	31.76	1.022	1.457	.470	+1.5	+6.2
357	4.507	35.85	1.012	1.452	.467	+1.6	+5.1

MODEL 188

L/B	DEPL N	LCG M
4.09	119.49	-.060

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
337	1.124	2.94	1.372	1.477	.514	-.1	-2.4
338	1.503	6.21	1.312	1.482	.510	+.0	-4.4
339	1.876	9.71	1.182	1.467	.496	+1.0	-7.0
347	2.065	11.21	1.062	1.457	.476	+1.6	-6.6
341	2.627	14.52	.952	1.446	.453	+1.7	-2.7
342	3.002	17.08	.902	1.437	.442	+1.8	+.7
343	3.382	19.61	.882	1.432	.434	+1.8	+4.6
344	3.751	22.37	.852	1.432	.428	+1.7	+8.0
345	4.134	25.18	.802	1.427	.414	+1.7	+9.7
346	4.506	27.90	.732	1.422	.397	+1.8	+8.6

MODEL 188

L/B	DEPL	LCG
	N	M
4.09	119.49	-.120

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
327	1.125	3.25	1.252	1.462	.501	+.2	-2.3
328	1.503	6.29	1.132	1.457	.485	+.3	-4.9
329	1.876	9.77	.932	1.442	.449	+1.3	-7.9
330	2.256	11.97	.832	1.422	.418	+2.0	-4.3
331	2.627	13.44	.812	1.417	.411	+1.9	-1.4
332	3.000	15.42	.772	1.412	.401	+1.9	+1.1
333	3.384	17.40	.762	1.407	.396	+2.0	+5.9
334	3.751	19.21	.742	1.407	.390	+2.0	+10.4
335	4.130	20.75	.697	1.387	.370	+2.0	+12.7
336	4.507	23.49	.647	1.382	.352	+2.1	+12.6

MODEL 188

L/B	DEPL N	LCG M
4.09	119.49	-.180

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
317	1.124	3.37	1.112	1.432	.477	+.2	-1.8
318	1.503	6.60	1.012	1.422	.453	+.6	-3.9
319	1.877	10.58	.912	1.407	.428	+1.7	-6.1
320	2.255	12.58	.772	1.397	.395	+2.0	-2.3
321	2.628	14.10	.752	1.367	.377	+2.1	+.7
322	3.004	15.83	.732	1.357	.370	+2.2	+4.6
323	3.382	17.41	.712	1.347	.362	+2.3	+9.2
324	3.754	18.47	.627	1.332	.335	+2.4	+13.6
325	4.136	19.97	.622	1.327	.333	+2.3	+16.4
326	4.507	21.84	.612	1.322	.330	+2.1	+16.6

MODEL 189

L/B	DEPL	LCG
	N	M
5.50	237.40	+.000

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
302	1.265	5.98	1.500	1.500	.387	+.2	-1.7
303	1.684	13.99	1.500	1.500	.387	+.1	-10.8
314	1.894	19.09	1.500	1.500	.387	+1.2	-13.5
304	2.112	24.40	1.500	1.500	.387	+2.0	-17.0
305	2.515	28.31	1.500	1.500	.387	+2.3	-12.8
306	2.949	32.54	1.500	1.500	.387	+2.7	-5.6
315	3.160	34.95	1.500	1.500	.387	+2.4	-5.1
307	3.360	38.01	1.500	1.500	.387	+2.2	-4.4
310	3.585	41.92	1.500	1.500	.387	+2.0	-4.7
313	3.794	49.32	1.500	1.500	.387	+1.8	-5.6
309	4.205	57.80	1.500	1.500	.387	+1.3	-7.9
311	4.611	80.87	1.500	1.500	.387	+1.1	-12.8

MODEL 189

L/B	DEPL N	LCG M
5.50	237.40	-.060

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
292	1.272	6.15	1.500	1.500	.387	+.2	-2.2
293	1.686	13.55	1.500	1.500	.387	+.8	-7.2
294	2.104	25.25	1.500	1.500	.387	+2.4	-15.1
295	2.524	29.47	1.442	1.487	.386	+3.0	-10.3
296	2.952	32.91	1.422	1.480	.385	+3.1	-5.4
297	3.386	37.02	1.372	1.472	.381	+3.3	+.3
298	3.797	40.79	1.292	1.448	.373	+3.9	+6.9
299	4.209	41.89	1.162	1.407	.351	+5.0	+12.8
300	4.612	42.66	1.047	1.347	.324	+5.9	+20.9
301	5.035	43.03	.992	1.327	.312	+6.1	+26.7

MODEL 189
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L/B	DEPL	LCG
	N	M
5.50	237.40	-.120

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
281	1.266	6.86	1.500	1.500	.387	+.3	-2.7
282	1.676	14.27	1.500	1.500	.387	+1.1	-9.5
291	1.897	20.47	1.432	1.484	.385	+2.0	-12.4
283	2.104	28.59	1.352	1.462	.378	+3.1	-11.7
284	2.526	31.75	1.262	1.437	.369	+3.5	-6.6
285	2.951	34.56	1.212	1.422	.360	+3.8	-1.5
286	3.373	38.10	1.132	1.392	.345	+4.4	+5.1
287	3.788	41.65	1.039	1.347	.323	+5.3	+13.4
288	4.208	45.54	.942	1.237	.289	+6.3	+23.3
289	4.616	46.13	.892	1.177	.272	+6.3	+29.6
290	5.072	45.18	.862	1.152	.262	+5.9	+35.0

MODEL 189

L/B	DEPL N	LCG M
5.50	237.40	-.180

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
270	1.266	7.19	1.422	1.477	.385	+.4	-4.3
271	1.685	16.23	1.312	1.442	.373	+1.8	-9.4
272	2.103	28.95	1.202	1.402	.355	+3.6	-9.1
273	2.523	37.21	1.102	1.352	.333	+4.5	-5.0
274	2.950	42.14	1.037	1.317	.317	+5.3	+.9
275	3.390	46.67	.957	1.197	.285	+6.4	+11.1
276	3.796	52.47	.867	1.072	.251	+7.2	+20.3
280	4.000	52.42	.842	1.042	.243	+7.2	+26.1
277	4.231	51.17	.807	1.012	.233	+6.9	+30.7
278	4.653	50.29	.772	.992	.225	+6.4	+39.4
279	5.117	48.09	.752	.982	.220	+5.7	+45.4

MODEL 189
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L/B	DEPL N	LCG M
5.50	147.25	+.000

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
227	1.163	3.28	1.500	1.500	.387	-.2	-2.7
228	1.551	7.19	1.500	1.500	.387	-.3	-6.3
237	1.754	9.74	1.500	1.500	.387	+.4	-8.8
229	1.945	11.77	1.500	1.500	.387	+1.1	-9.5
231	2.344	14.71	1.500	1.500	.387	+1.9	-5.9
232	2.719	17.42	1.467	1.492	.386	+2.1	-4.2
233	3.114	20.73	1.467	1.492	.386	+2.0	-1.5
234	3.505	24.49	1.472	1.497	.386	+1.8	+1.7
235	3.893	29.80	1.500	1.500	.387	+1.5	+1.5
236	4.301	41.46	1.500	1.500	.387	+.4	-9.3

MODEL 189

L/B	DEPL N	LCG M
5.50	147.25	-.060

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
239	1.164	3.41	1.500	1.500	.387	+.0	-2.8
240	1.552	7.33	1.500	1.500	.387	+.1	-5.7
241	1.947	12.74	1.500	1.500	.387	+1.7	-8.1
242	2.335	14.93	1.367	1.472	.381	+2.3	-4.2
243	2.728	17.06	1.322	1.465	.378	+2.3	-2.3
244	3.012	18.95	1.292	1.456	.374	+2.4	+.8
245	3.511	21.76	1.232	1.445	.369	+2.6	+6.2
246	3.900	23.32	1.172	1.432	.359	+2.8	+9.2
247	4.284	24.75	1.092	1.420	.348	+3.2	+11.2
248	4.666	25.51	1.022	1.399	.332	+3.6	+13.4

MODEL 189

L/B	DEPL N	LCG M
5.50	147.25	-.120

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
250	1.163	3.55	1.447	1.487	.386	+.1	-2.4
251	1.552	7.91	1.432	1.485	.385	+.6	-5.5
252	1.947	13.22	1.292	1.457	.374	+2.0	-7.9
253	2.336	15.31	1.192	1.432	.361	+2.5	-4.2
254	2.727	16.99	1.152	1.427	.356	+2.6	-1.2
255	3.026	18.30	1.112	1.417	.348	+2.8	+1.9
256	3.499	20.55	1.047	1.397	.335	+3.0	+7.6
257	3.882	22.25	.982	1.357	.317	+3.4	+11.9
258	4.283	23.52	.922	1.347	.305	+3.8	+14.9
259	4.668	24.46	.872	1.319	.291	+3.9	+18.4

MODEL 189
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L/B	DEPL	LCG
	N	M
5.50	147.25	-.180

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
260	1.164	3.64	1.400	1.462	.381	+.3	-2.1
261	1.553	8.14	1.272	1.449	.372	+.9	-5.5
262	1.945	15.15	1.117	1.412	.347	+2.4	-7.5
263	2.335	17.23	1.037	1.402	.335	+2.8	-3.2
264	2.727	18.62	.992	1.367	.321	+2.9	+.5
265	3.092	20.59	.962	1.352	.312	+3.2	+4.5
266	3.498	22.90	.892	1.302	.291	+3.8	+10.4
267	3.887	24.27	.852	1.195	.269	+4.2	+16.9
268	4.279	25.02	.792	1.142	.250	+4.3	+21.7
269	4.665	25.17	.762	1.115	.241	+4.1	+24.5

MODEL 189

L/B	DEPL N	LCG M
5.50	102.61	+.000

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
217	1.094	2.08	1.500	1.500	.387	-.1	-1.8
218	1.461	4.52	1.500	1.500	.387	-.1	-4.1
219	1.835	7.23	1.500	1.500	.387	+.6	-6.6
220	2.203	9.36	1.422	1.487	.386	+1.3	-4.1
221	2.562	11.05	1.392	1.482	.385	+1.4	-2.5
222	2.928	13.47	1.372	1.477	.382	+1.6	-.9
223	3.293	15.65	1.322	1.475	.379	+1.6	+1.7
224	3.652	18.07	1.312	1.472	.378	+1.6	+4.6
225	4.022	20.35	1.277	1.467	.375	+1.7	+5.9
226	4.400	22.82	1.232	1.460	.371	+1.9	+6.3

MODEL 189
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L/B	DEPL	LCG
	N	M
5.50	102.61	-.060

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
207	1.093	2.22	1.457	1.492	.386	-.1	-1.5
208	1.461	4.52	1.457	1.492	.386	+.0	-4.0
209	1.834	7.16	1.392	1.482	.385	+.8	-5.4
210	2.202	9.01	1.292	1.462	.375	+1.5	-4.5
211	2.561	10.44	1.242	1.457	.371	+1.6	-3.0
212	2.928	12.19	1.192	1.447	.366	+1.7	-.6
213	3.298	14.21	1.152	1.442	.360	+1.8	+3.6
214	3.671	16.45	1.102	1.442	.355	+1.9	+6.3
215	4.028	17.68	1.067	1.432	.347	+1.9	+8.1
216	4.401	19.64	1.012	1.427	.339	+2.0	+7.3

MODEL 189

L/B	DEPL N	LCG M
5.50	102.61	-.120

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
197	1.093	2.41	1.352	1.472	.380	+.1	-1.6
198	1.461	4.64	1.292	1.467	.376	+.3	-3.5
199	1.835	7.40	1.207	1.452	.368	+1.1	-5.9
200	2.204	9.16	1.112	1.432	.352	+1.8	-3.7
201	2.562	10.30	1.052	1.427	.344	+1.8	-2.1
202	2.928	11.74	1.012	1.422	.337	+1.9	+1.1
203	3.298	13.21	.972	1.417	.330	+2.0	+4.3
204	3.664	14.63	.937	1.407	.323	+2.0	+7.5
205	4.022	15.88	.882	1.392	.310	+2.1	+8.9
206	4.400	17.41	.862	1.372	.301	+2.4	+9.4

MODEL 189

L/B	DEPL	LCG
	N	M
5.50	102.61	-.180

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
187	1.042	2.25	1.282	1.442	.371	+.2	-1.6
188	1.394	4.56	1.212	1.437	.364	+.5	-3.4
189	1.833	8.38	1.082	1.412	.344	+1.5	-6.4
190	2.201	10.16	.952	1.372	.316	+2.1	-3.0
191	2.560	11.06	.912	1.367	.308	+2.0	-.6
192	2.926	12.49	.882	1.352	.300	+2.1	+2.2
193	3.307	13.94	.872	1.347	.297	+2.3	+6.0
194	3.667	15.24	.832	1.337	.282	+2.4	+11.1
195	4.040	16.32	.787	1.292	.272	+2.7	+12.9
196	4.410	17.20	.742	1.262	.259	+2.7	+14.6

MODEL 189
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L/B	DEPL N	LCG M
5.50	76.62	+.000

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
146	1.043	1.54	1.452	1.492	.386	-.1	-1.5
147	1.396	3.19	1.452	1.492	.386	-.1	-2.9
148	1.747	5.03	1.432	1.487	.385	+.2	-4.2
149	2.093	6.70	1.372	1.477	.382	+.9	-3.8
150	2.441	7.92	1.312	1.472	.378	+1.1	-2.6
151	2.797	9.69	1.282	.467	.375	+1.1	-2.2
152	3.144	11.74	1.262	1.467	.375	+1.3	+.3
153	3.497	13.84	1.222	1.465	.372	+1.3	+2.9
154	3.843	15.74	1.202	1.462	.370	+1.2	+5.9
155	4.196	18.18	1.172	1.457	.366	+1.2	+4.4

MODEL 189

L/B	DEPL	LCG
	N	M
5.50	76.62	-.060

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
156	1.042	1.59	1.372	1.482	.383	+.0	-1.5
157	1.395	3.32	1.342	1.489	.385	+.1	-2.7
158	1.744	4.79	1.322	1.475	.379	+.5	-4.3
159	2.090	6.39	1.212	1.462	.370	+1.0	-3.9
160	2.441	7.45	1.122	1.452	.360	+1.1	-2.0
161	2.795	9.19	1.092	1.449	.356	+1.2	-1.4
162	3.144	10.87	1.072	1.447	.352	+1.3	+1.1
163	3.485	12.95	1.012	1.439	.343	+1.3	+4.6
164	3.832	14.63	.972	1.436	.338	+1.2	+6.2
165	4.186	15.69	.932	1.432	.330	+1.3	+5.8

MODEL 189

L/B	DEPL N	LCG M
5.50	76.62	-.120

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
166	1.043	1.75	1.232	1.460	.371	+.1	-.9
167	1.396	3.27	1.182	1.455	.366	+.2	-2.4
168	1.746	4.81	1.092	1.442	.354	+.8	-4.2
169	2.091	6.24	1.022	1.432	.342	+1.3	-4.3
170	2.442	7.14	.952	1.427	.330	+1.3	-1.5
171	2.798	8.41	.892	1.422	.320	+1.3	-1.0
172	3.145	9.89	.892	1.417	.320	+1.4	+2.5
173	3.482	11.03	.842	1.409	.309	+1.4	+5.6
174	3.834	12.70	.832	1.407	.306	+1.4	+8.3
175	4.186	14.21	.792	1.402	.298	+1.4	+7.7

MODEL 189

L/B	DEPL	LCG
	N	M
5.50	76.62	-.180

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
176	1.042	1.89	1.192	1.437	.363	+.1	-1.2
177	1.395	3.55	1.112	1.432	.352	+.4	-2.6
178	1.743	5.57	1.012	1.417	.336	+1.0	-4.2
179	2.089	6.93	.952	1.402	.323	+1.4	-3.5
180	2.438	7.74	.892	1.392	.311	+1.4	-1.1
181	2.784	8.94	.852	1.362	.298	+1.5	+.1
182	3.144	10.35	.792	1.367	.289	+1.6	+3.8
183	3.484	11.49	.772	1.357	.283	+1.5	+6.6
184	3.831	12.90	.767	1.349	.280	+1.6	+9.2
185	4.182	14.01	.732	1.347	.272	+1.7	+9.6

MODEL 190

L/B	DEPL	LCG
	N	M
7.00	165.20	+.000

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
111	1.183	3.29	1.500	1.500	.304	-.1	-3.7
112	1.584	7.68	1.500	1.500	.304	+.0	-6.7
122	1.783	10.38	1.500	1.500	.304	+.6	-9.4
113	1.988	13.20	1.500	1.500	.304	+1.6	-10.2
114	2.376	16.07	1.500	1.500	.304	+2.1	-7.3
115	2.776	18.49	1.500	1.500	.304	+2.2	-5.8
116	3.169	21.20	1.500	1.500	.304	+2.1	-3.4
117	3.561	24.20	1.500	1.500	.304	+1.9	-.8
118	3.971	28.91	1.500	1.500	.304	+1.5	-2.1
119	4.371	34.53	1.500	1.500	.304	+1.3	-5.0
120	4.464	36.35	1.500	1.500	.304	+1.3	-5.9
121	4.769	41.39	1.500	1.500	.304	+1.3	-9.0

MODEL 190

L/B	DEPL	LCG
	N	M
7.00	165.20	-.060

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
124	1.192	3.54	1.500	1.500	.304	+.0	-3.2
125	1.582	7.68	1.500	1.500	.304	+.3	-6.1
134	1.783	10.39	1.500	1.500	.304	+1.0	-8.2
126	1.986	14.12	1.500	1.500	.304	+1.8	-8.4
127	2.372	17.29	1.500	1.500	.304	+2.5	-5.3
128	2.773	18.98	1.439	1.477	.302	+2.6	-4.0
129	3.172	21.49	1.432	1.467	.301	+2.7	+.0
130	3.564	23.77	1.415	1.464	.300	+2.8	+3.5
131	3.968	26.16	1.387	1.452	.297	+3.0	+6.5
132	4.359	28.16	1.302	1.427	.290	+3.6	+7.9
133	4.774	28.80	1.172	1.392	.274	+4.8	+12.0

MODEL 190
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L/B	DEPL	LCG
	N	M
7.00	165.20	-.120

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
135	1.193	3.84	1.500	1.500	.304	+.2	-3.1
136	1.582	8.10	1.500	1.500	.304	+.7	-6.0
145	1.786	11.05	1.452	1.482	.302	+1.4	-7.9
137	1.986	14.77	1.422	1.462	.300	+2.2	-8.6
138	2.373	18.43	1.352	1.439	.294	+2.8	-6.3
139	2.774	20.57	1.312	1.432	.291	+3.1	-2.8
140	3.173	22.44	1.272	1.417	.286	+3.2	+1.2
141	3.565	24.84	1.212	1.397	.279	+3.7	+5.3
142	3.975	26.43	1.127	1.352	.264	+4.4	+8.5
143	4.369	28.86	1.032	1.292	.245	+4.9	+10.8
144	4.776	30.50	.942	1.172	.219	+6.0	+20.4

MODEL 190

L/B	DEPL N	LCG M
7.00	102.42	+.000

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
71	1.102	1.90	1.500	1.500	.304	-.1	-2.3
72	1.461	3.98	1.500	1.500	.304	-.1	-4.4
73	1.833	6.74	1.500	1.500	.304	+.6	-7.2
74	2.211	8.94	1.477	1.495	.303	+1.4	-5.4
75	2.557	10.31	1.469	1.492	.303	+1.5	-4.3
76	2.927	12.52	1.464	1.489	.302	+1.7	-3.2
77	3.295	14.48	1.458	1.488	.302	+1.8	-.7
78	3.669	17.00	1.460	1.492	.302	+1.6	+1.7
79	4.036	20.56	1.464	1.490	.302	+1.4	+1.4
80	4.403	24.40	1.479	1.497	.302	+1.1	-1.6

MODEL 190

L/B	DEPL	LCG
	N	M
7.00	102.42	-.060

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
81	1.092	2.08	1.500	1.500	.304	+.0	-1.6
82	1.462	4.26	1.500	1.500	.304	+.1	-3.2
83	1.835	7.12	1.464	1.492	.302	+1.0	-5.7
84	2.193	8.72	1.414	1.472	.301	+1.6	-4.5
85	2.561	10.00	1.389	1.466	.299	+1.7	-3.3
86	2.928	11.60	1.372	1.461	.298	+1.9	-1.1
87	3.292	12.87	1.342	1.458	.296	+1.9	+2.0
88	3.660	14.95	1.312	1.444	.293	+2.0	+4.9
89	4.040	16.16	1.272	1.437	.289	+2.2	+6.3
90	4.403	17.65	1.212	1.424	.283	+2.4	+5.8

MODEL 190

L/B	DEPL	LCG
	N	M
7.00	102.42	-.120

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
91	1.092	2.15	1.442	1.482	.302	+.2	-2.0
92	1.462	4.71	1.434	1.479	.302	+.4	-4.2
93	1.835	7.57	1.377	1.464	.299	+1.4	-6.4
94	2.201	9.14	1.292	1.437	.291	+2.0	-4.8
95	2.562	10.20	1.252	1.427	.286	+2.0	-2.8
96	2.930	11.59	1.202	1.418	.281	+2.2	-.4
97	3.298	13.33	1.172	1.412	.277	+2.3	+3.2
98	3.667	14.49	1.122	1.400	.270	+2.3	+6.6
99	4.022	15.90	1.072	1.378	.262	+2.6	+8.0
100	4.404	16.89	1.002	1.354	.250	+2.9	+8.0

MODEL 190
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L/B	DEPL	LCG
	N	M
7.00	102.42	-.180

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
101	1.092	2.24	1.332	1.454	.295	+.2	-1.9
102	1.462	4.93	1.332	1.447	.294	+.6	-4.4
103	1.835	8.28	1.212	1.422	.283	+1.5	-6.8
104	2.202	10.44	1.132	1.384	.269	+2.2	-4.7
105	2.562	11.46	1.102	1.375	.264	+2.2	-3.2
106	2.932	12.74	1.062	1.360	.258	+2.4	+.2
107	3.317	13.61	1.027	1.342	.251	+2.5	+3.9
108	3.669	15.23	.972	1.317	.241	+2.8	+7.6
109	4.026	16.63	.917	1.272	.228	+3.1	+10.2
110	4.408	17.72	.837	1.152	.203	+3.8	+12.6

MODEL 190

L/B	DEPL	LCG
	N	M
7.00	71.32	+.000

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
31	1.031	1.44	1.500	1.500	.304	-.1	-1.0
32	1.374	2.85	1.500	1.500	.304	-.1	-2.8
33	1.724	4.32	1.482	1.494	.304	+.3	-4.4
34	2.069	5.88	1.454	1.487	.302	+.9	-4.4
35	2.417	6.88	1.425	1.477	.301	+1.1	-2.7
36	2.756	8.19	1.420	1.472	.300	+1.2	-2.0
37	3.100	9.63	1.405	1.468	.300	+1.3	-1.6
38	3.453	11.20	1.394	1.465	.299	+1.4	+1.7
39	3.796	12.90	1.385	1.464	.299	+1.3	+3.1
40	4.143	14.96	1.371	1.460	.298	+1.3	+2.8

MODEL 190

L/B	DEPL	LCG
	N	M
7.00	71.32	-.060

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
41	1.032	1.48	1.432	1.482	.302	+.0	-.6
42	1.376	2.88	1.429	1.482	.302	+.1	-2.4
43	1.725	4.35	1.412	1.472	.300	+.6	-3.8
44	2.072	5.64	1.362	1.462	.297	+1.0	-3.4
45	2.408	6.47	1.332	1.450	.295	+1.2	-2.2
46	2.755	7.65	1.312	1.444	.293	+1.3	-1.9
47	3.122	8.95	1.282	1.440	.290	+1.5	+1.1
48	3.438	10.32	1.267	1.437	.289	+1.6	+3.0
49	3.792	11.57	1.212	1.432	.284	+1.6	+5.6
50	4.040	12.53	1.172	1.424	.280	+1.6	+6.2

MODEL 190

L/B	DEPL	LCG
	N	M
7.00	71.32	-.120

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
51	1.032	1.23	1.500	1.500	.304	+.1	-1.3
52	1.376	2.64	1.372	1.452	.297	+.2	-2.6
53	1.725	4.37	1.322	1.447	.294	+.8	-4.4
54	2.070	5.50	1.262	1.437	.289	+1.3	-3.8
55	2.413	6.24	1.182	1.427	.281	+1.4	-1.8
56	2.757	7.55	1.162	1.417	.277	+1.5	-1.3
57	3.092	8.61	1.152	1.412	.276	+1.6	+1.2
58	3.447	9.92	1.082	1.407	.268	+1.7	+3.9
59	3.791	11.13	1.042	1.402	.263	+1.7	+6.1
60	4.132	12.47	.982	1.392	.255	+1.8	+6.2

MODEL 190
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L/B	DEPL	LCG
	N	M
7.00	71.32	-.180

RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
61	1.036	1.59	1.332	1.437	.293	+.2	-1.4
62	1.375	3.14	1.282	1.427	.289	+.4	-3.0
63	1.723	4.94	1.162	1.412	.276	+1.1	-5.1
64	2.066	6.03	1.102	1.395	.268	+1.5	-4.4
65	2.416	6.84	1.042	1.382	.259	+1.6	-1.4
66	2.756	7.98	.992	1.367	.251	+1.7	-.9
67	3.110	9.06	.972	1.362	.248	+1.8	+1.6
68	3.456	9.69	.932	1.352	.242	+1.8	+5.7
69	3.788	10.67	.892	1.338	.234	+2.0	+7.6
70	4.137	11.76	.862	1.332	.229	+2.2	+8.2

MODEL 190

L/B	DEPL N	LCG M
7.00	53.37	-.060

RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
11	.980	1.07	1.500	1.500	.304	-.1	-.1
12	1.306	2.04	1.392	1.472	.300	+.0	-1.1
13	1.625	2.88	1.379	1.467	.299	+.2	-1.7
14	1.970	3.87	1.352	1.455	.296	+.7	-2.4
15	2.290	4.59	1.292	1.451	.293	+.9	-2.1
16	2.630	5.55	1.272	1.445	.291	+.9	-1.7
17	2.959	6.63	1.197	1.441	.285	+1.1	-.8
18	3.284	7.78	1.192	1.437	.284	+1.2	+1.4
19	3.617	9.02	1.162	1.432	.280	+1.2	+4.7
20	3.947	10.30	1.142	1.430	.278	+1.2	+5.2

MODEL 190

L/B	DEPL	LCG
	N	M
7.00	53.37	+.000

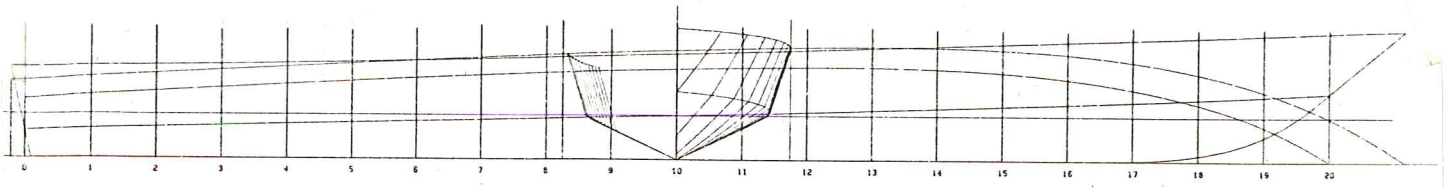
RUN	VM	RTM	LK	LC	S	THETA	Z
	M/S	N	M	M	M2	GRADEN	MM
1	.985	.99	1.448	1.489	.302	-.1	-1.3
2	1.315	1.92	1.457	1.488	.302	+.0	-2.2
3	1.723	3.20	1.452	1.487	.302	+.3	-3.0
4	1.972	3.90	1.427	1.477	.301	+.6	-3.8
5	2.315	5.01	1.389	1.467	.300	+.8	-2.3
6	2.637	6.11	1.380	1.465	.299	+.9	-2.4
7	2.961	7.24	1.364	1.462	.298	+1.0	-1.3
8	3.289	8.51	1.350	1.459	.297	+1.2	+.6
9	3.632	9.97	1.332	1.454	.295	+1.1	+3.4
10	3.937	11.48	1.312	1.452	.294	+1.1	+4.6

MODEL 190

L/B	DEPL	LCG
	N	M
7.00	53.37	-.120

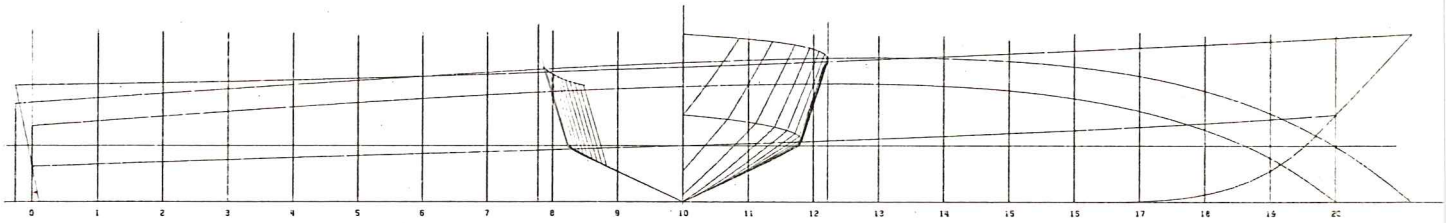
RUN	VM M/S	RTM N	LK M	LC M	S M2	THETA GRADEN	Z MM
21	.980	1.08	1.432	1.452	.300	+.0	-1.0
22	1.316	2.01	1.292	1.457	.294	+.2	-1.9
23	1.643	2.94	1.232	1.440	.287	+.5	-2.8
24	1.971	3.78	1.172	1.432	.280	+.8	-3.4
25	2.296	4.47	1.112	1.422	.274	+1.0	-1.3
26	2.624	5.32	1.062	1.419	.269	+1.0	-1.4
27	2.961	6.48	1.002	1.415	.261	+1.2	+.2
28	3.290	7.52	.972	1.412	.257	+1.2	+2.4
29	3.620	8.68	.952	1.402	.254	+1.2	+5.0
30	3.944	9.92	.920	1.397	.241	+1.2	+6.1

150 mm.



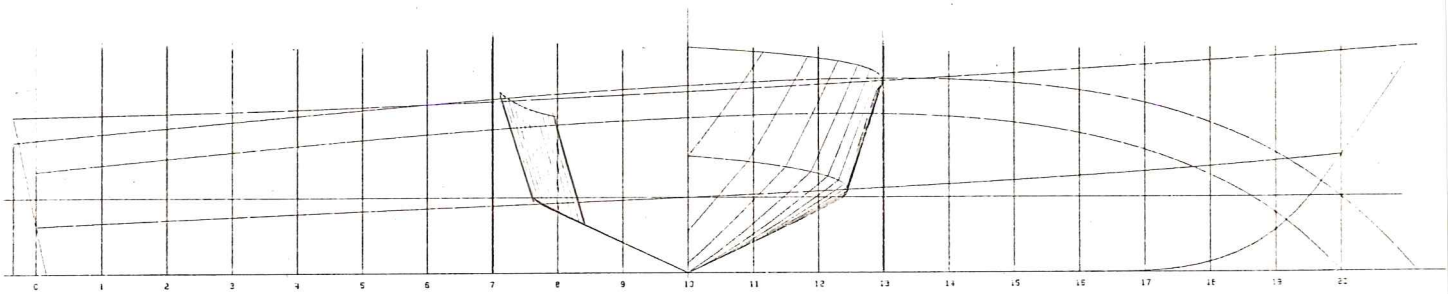
LIJNENPLAN SCHAAL 1:20

Model 190



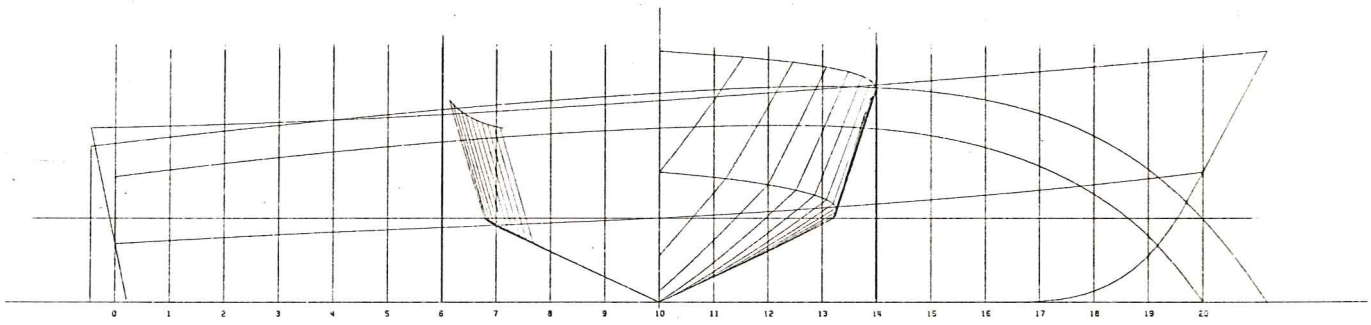
LIJNENPLAN SCHAAL 1:20

Model 189



LIJNENPLAN SCHAAL 1:20

Model 188



LIJNENPLAN SCHAAL 1:20

Model 187

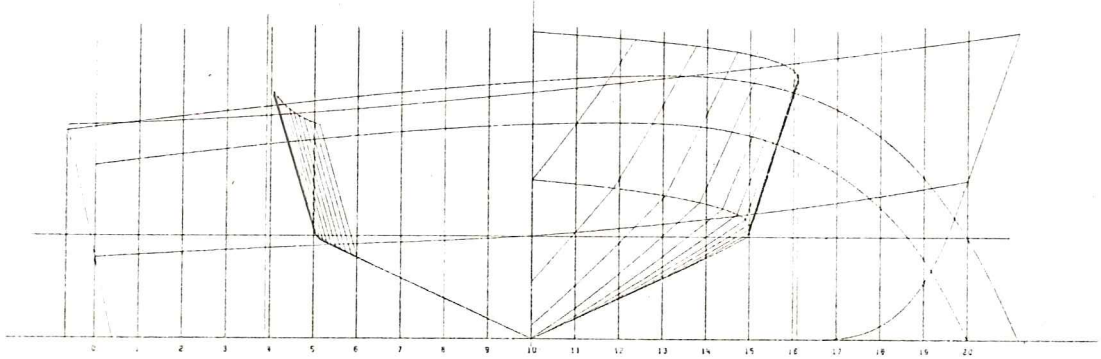


fig-2-

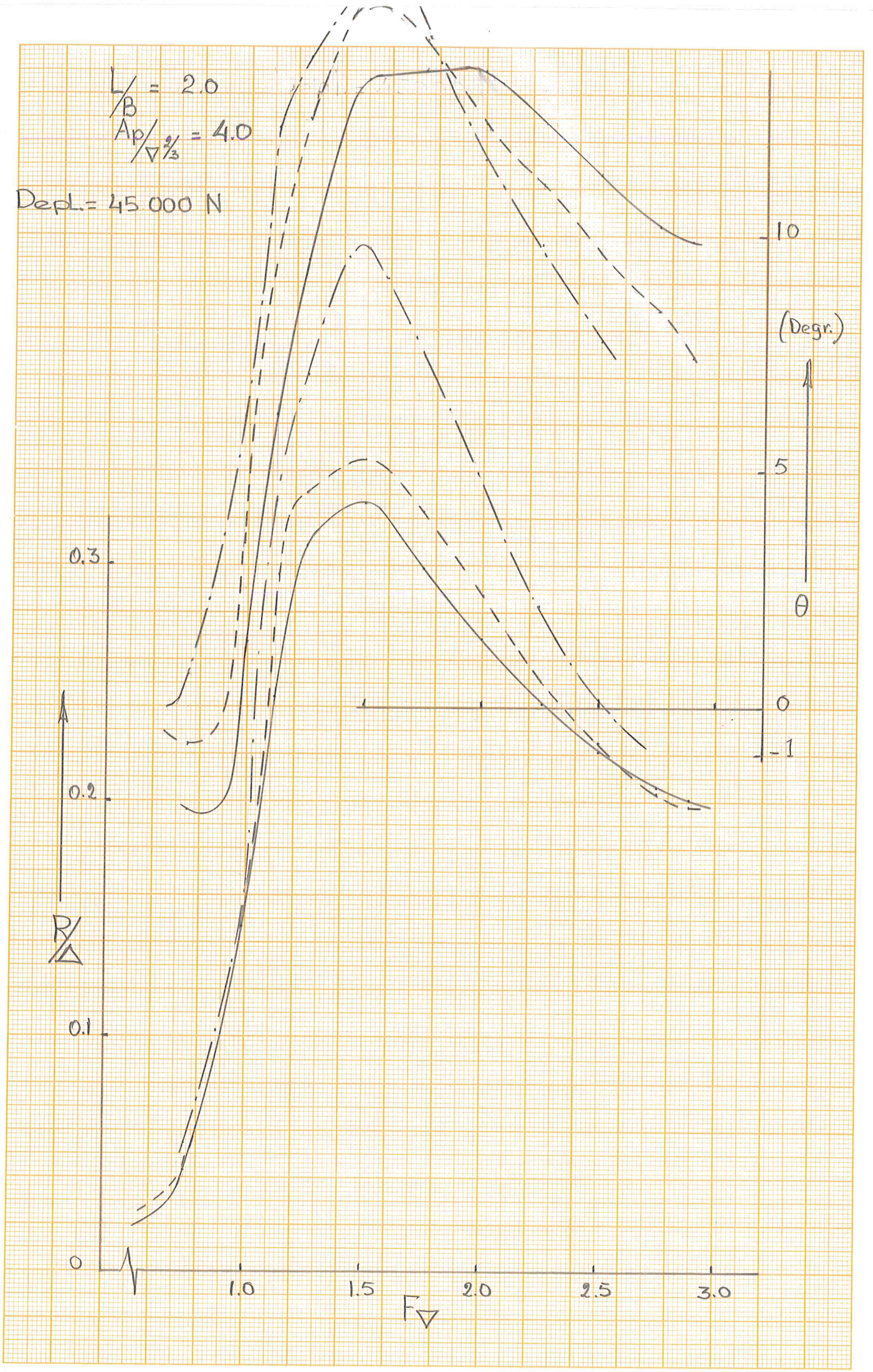

L/B = 2.0
Ap/∇2/3 = 4.0
Depl.= 45 000 N
10
(Degr.)
5
θ
0
-1
0.3
0.2
R/Δ
0.1
0
1.0
1.5
2.0
2.5
3.0
F∇

fig. 8.c.

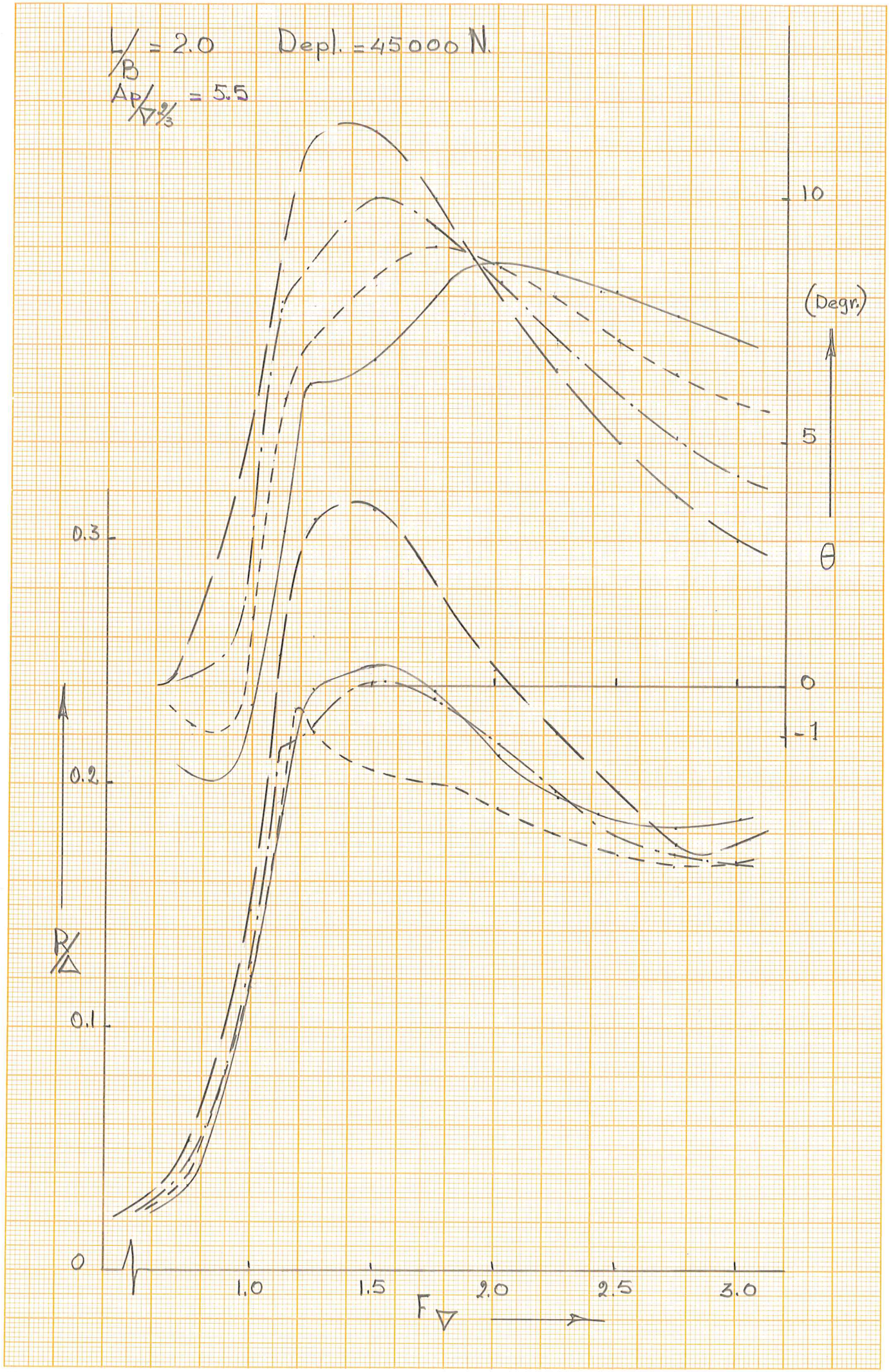

L/B = 2.0
Depl. = 45000 N.
Ap/∇2/3 = 5.5
10
(Degr.)
5
θ
0
-1
0.3
0.2
R/Δ
0.1
0
1.0
1.5
2.0
2.5
3.0
F∇

fig. 8.R

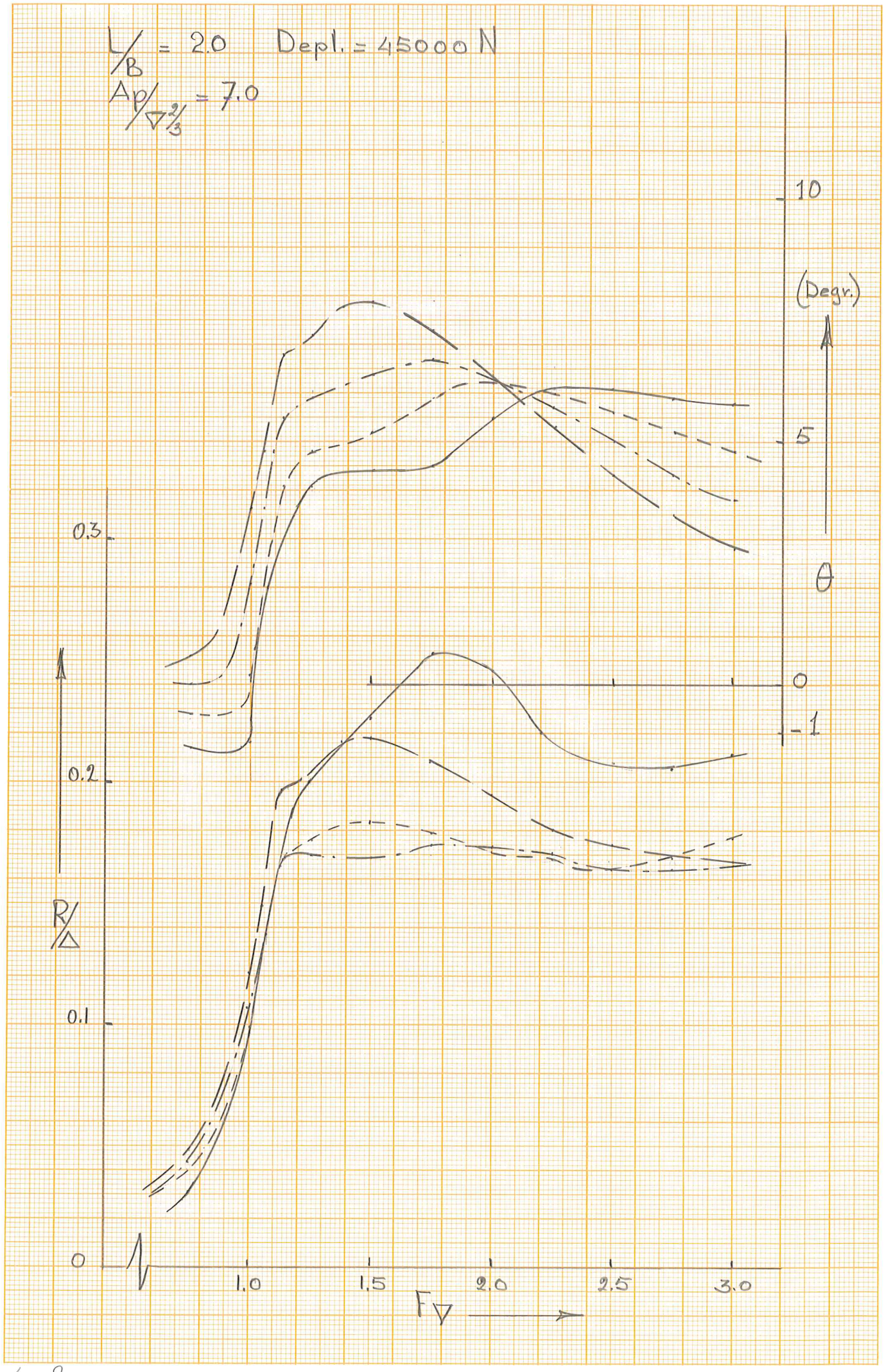

L/B = 2.0 Depl. = 45000 N
Ap/∇^2/3 = 7.0
10
(Degr.)
5
θ
0
-1
0.3
0.2
R/Δ
0.1
0
1.0
1.5
2.0
2.5
3.0
F∇

fig. 8 vervv. L.

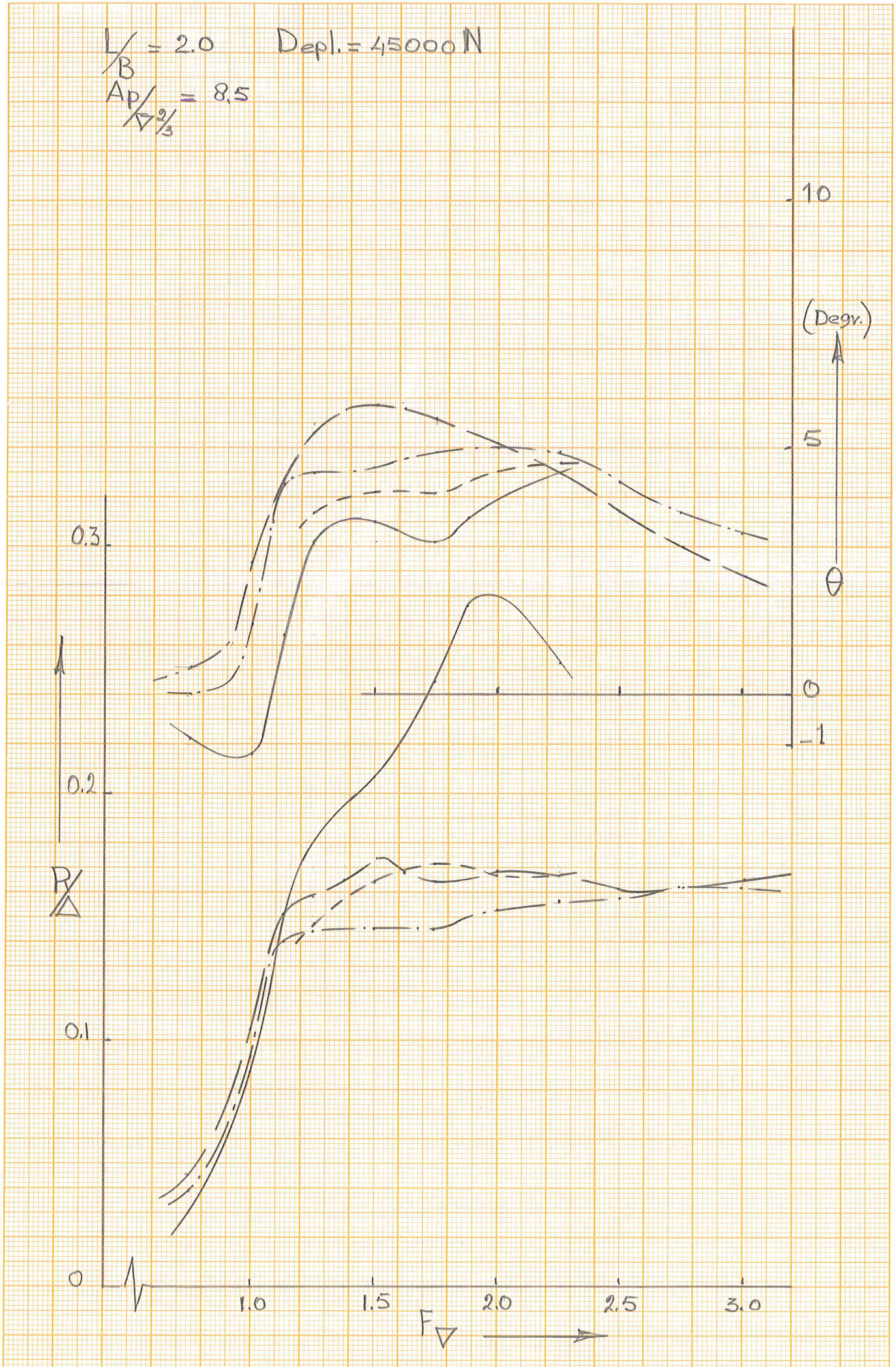

L/B = 2.0
Depl. = 45000 N
Ap/∇^2/3 = 8.5
10
(Degr.)
5
θ
0
-1
0.3
0.2
R/Δ
0.1
0
1.0
1.5
2.0
2.5
3.0
F∇

fig 8. VERU - R -

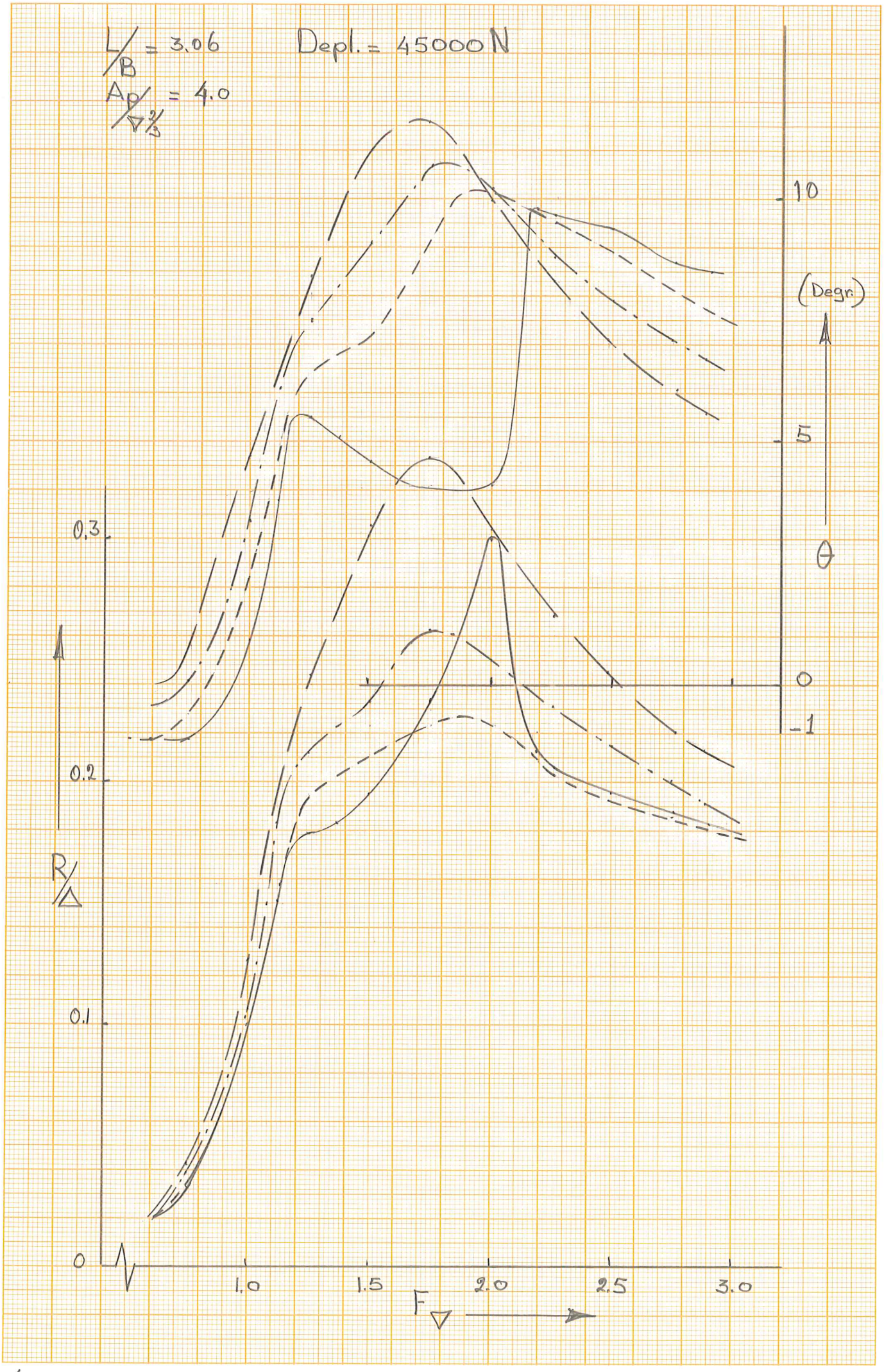

L/B = 3.06
Depl. = 45000 N
Ap/∇^2/3 = 4.0
10
(Degr.)
5
θ
0
-1
0.3
0.2
R/Δ
0.1
0
1.0
1.5
2.0
2.5
3.0
F∇

fig 9.2

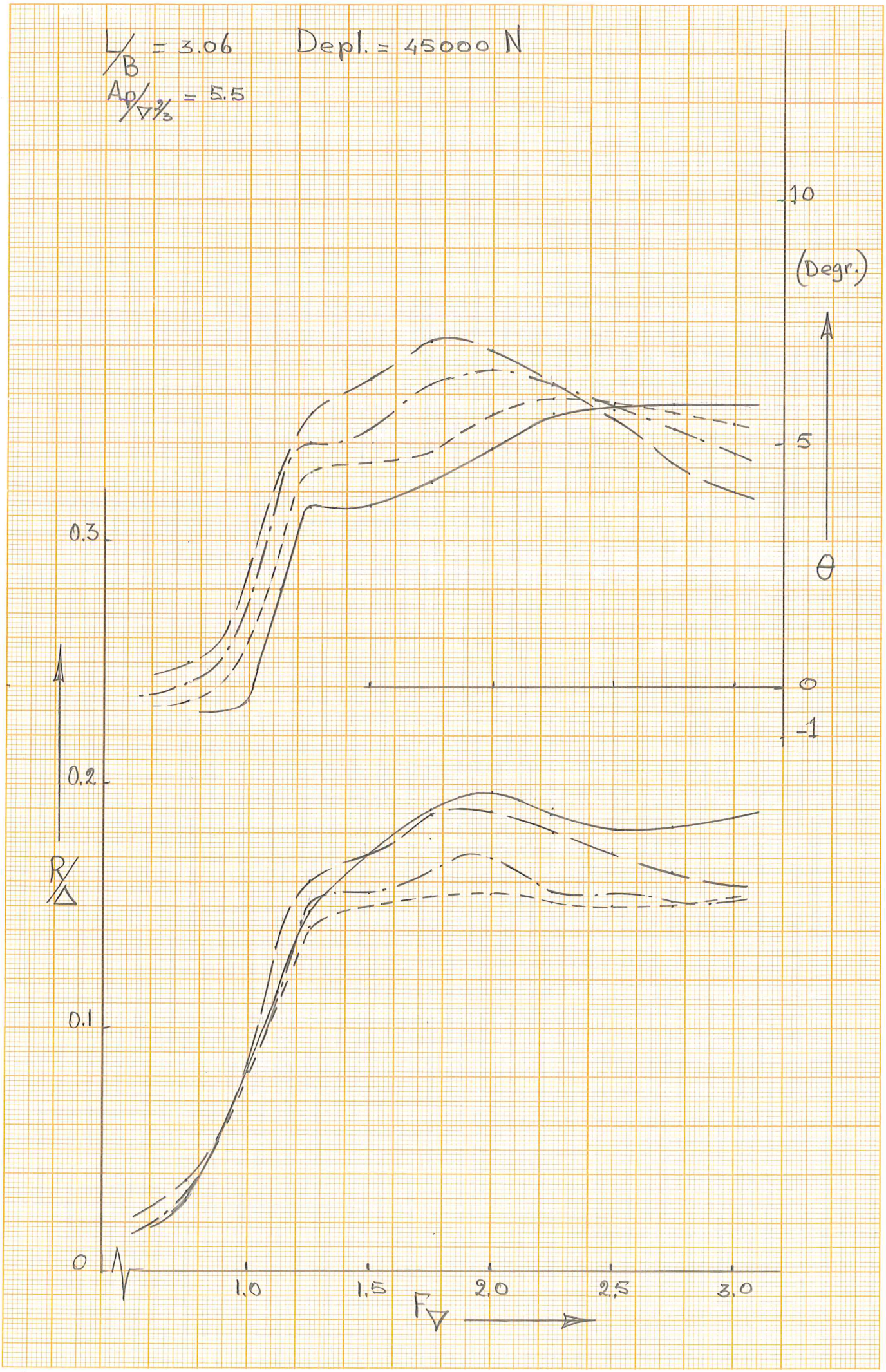

L/B = 3.06
Depl. = 45000 N
A_p/∇^2/3 = 5.5
10
(Degr.)
5
θ
0
-1
0.3
0.2
R/Δ
0.1
0
1.0
1.5
2.0
2.5
3.0
F∇

fig 9. R.

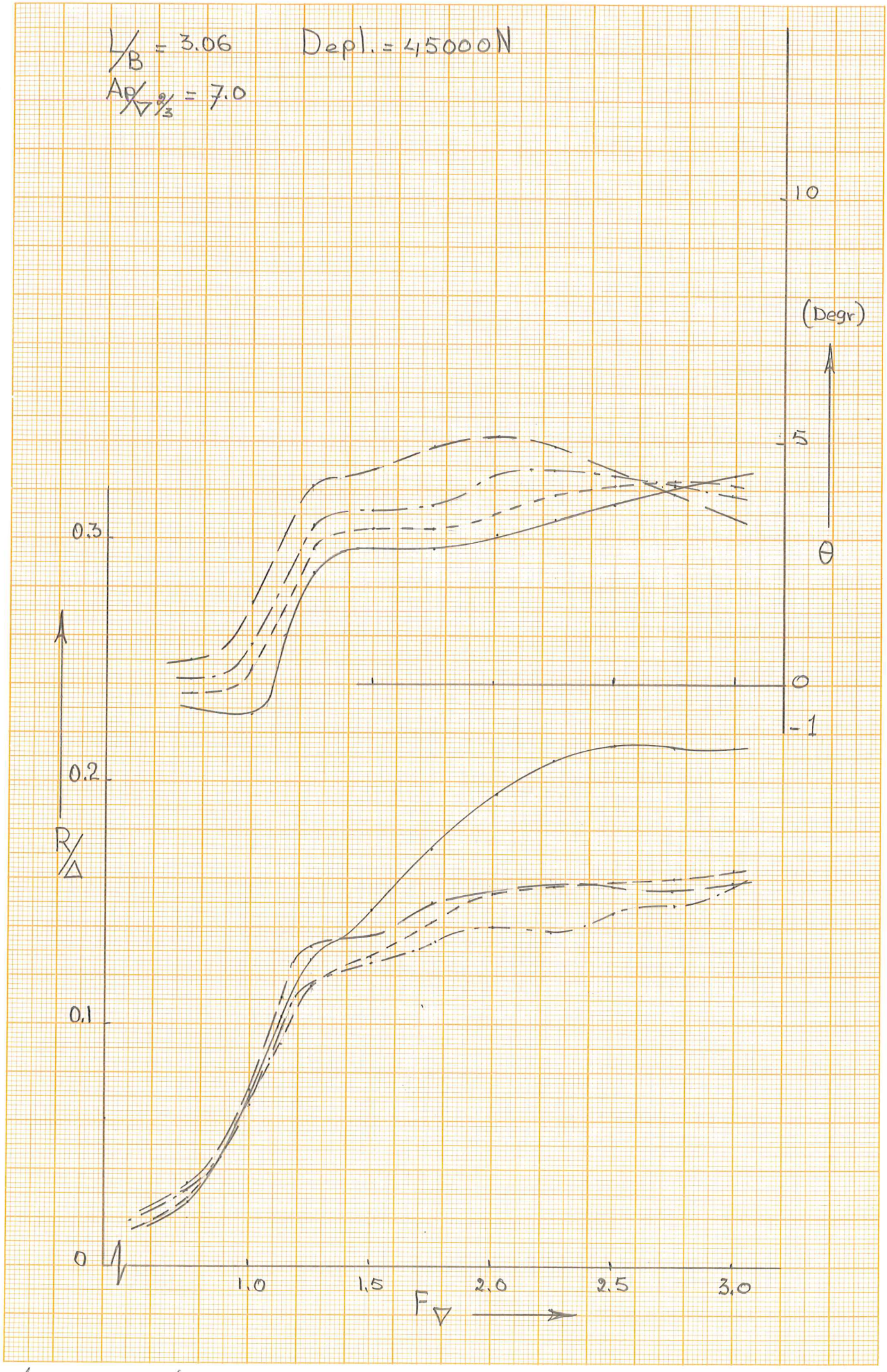

L/B = 3.06
Depl. = 45000N
Ap/∇^2/3 = 7.0
10
5
0
-1
(Degr)
θ
0.3
0.2
0.1
0
R/Δ
1.0
1.5
2.0
2.5
3.0
F∇

fig 9 verv. L.

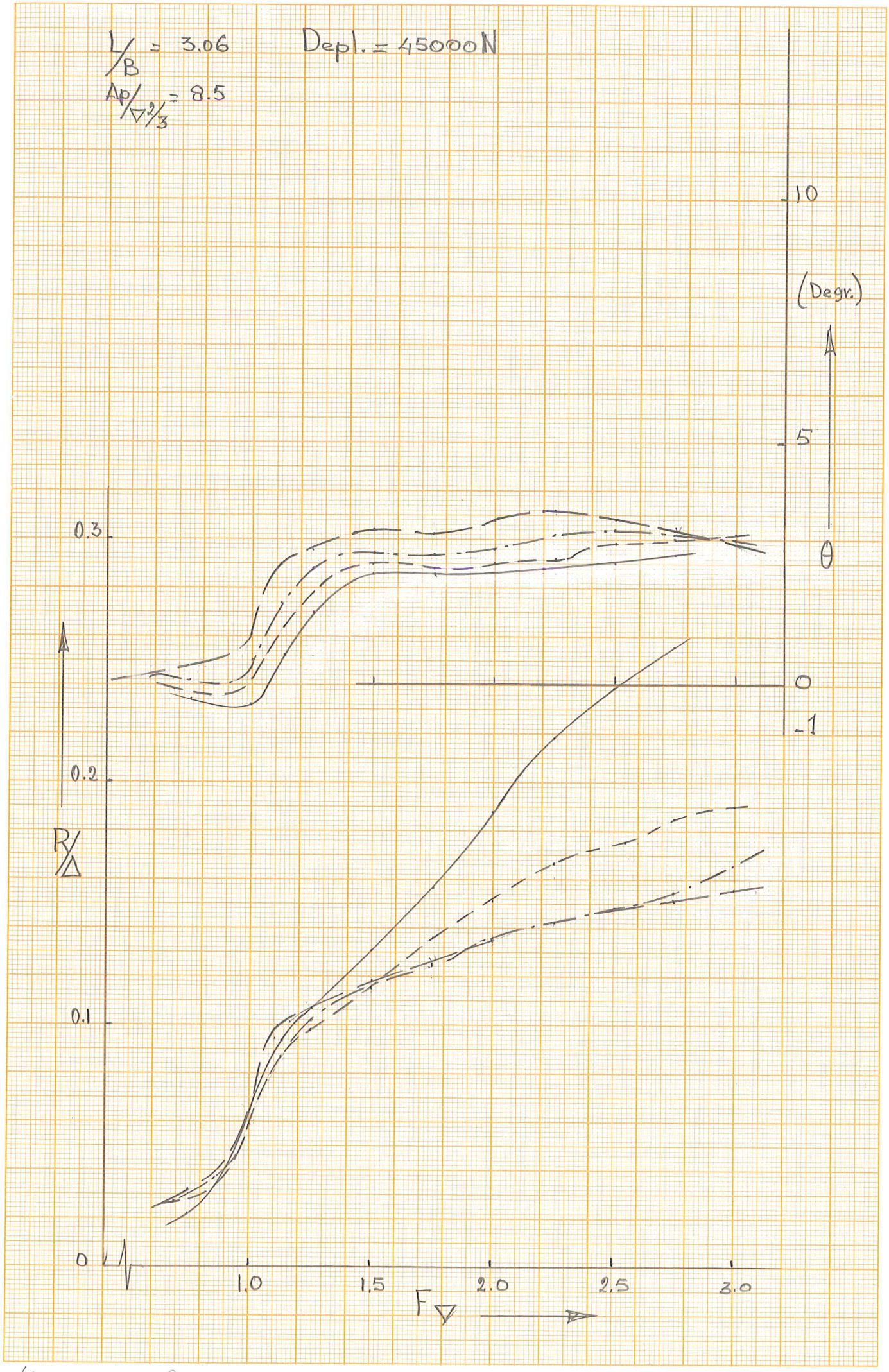

L/B = 3.06
Depl. = 45000N
Δp/∇^2/3 = 8.5
10
(Degr.)
5
θ
0
-1
0.3
0.2
0.1
0
R/Δ
1.0
1.5
2.0
2.5
3.0
F∇

fig 9 verw. R.

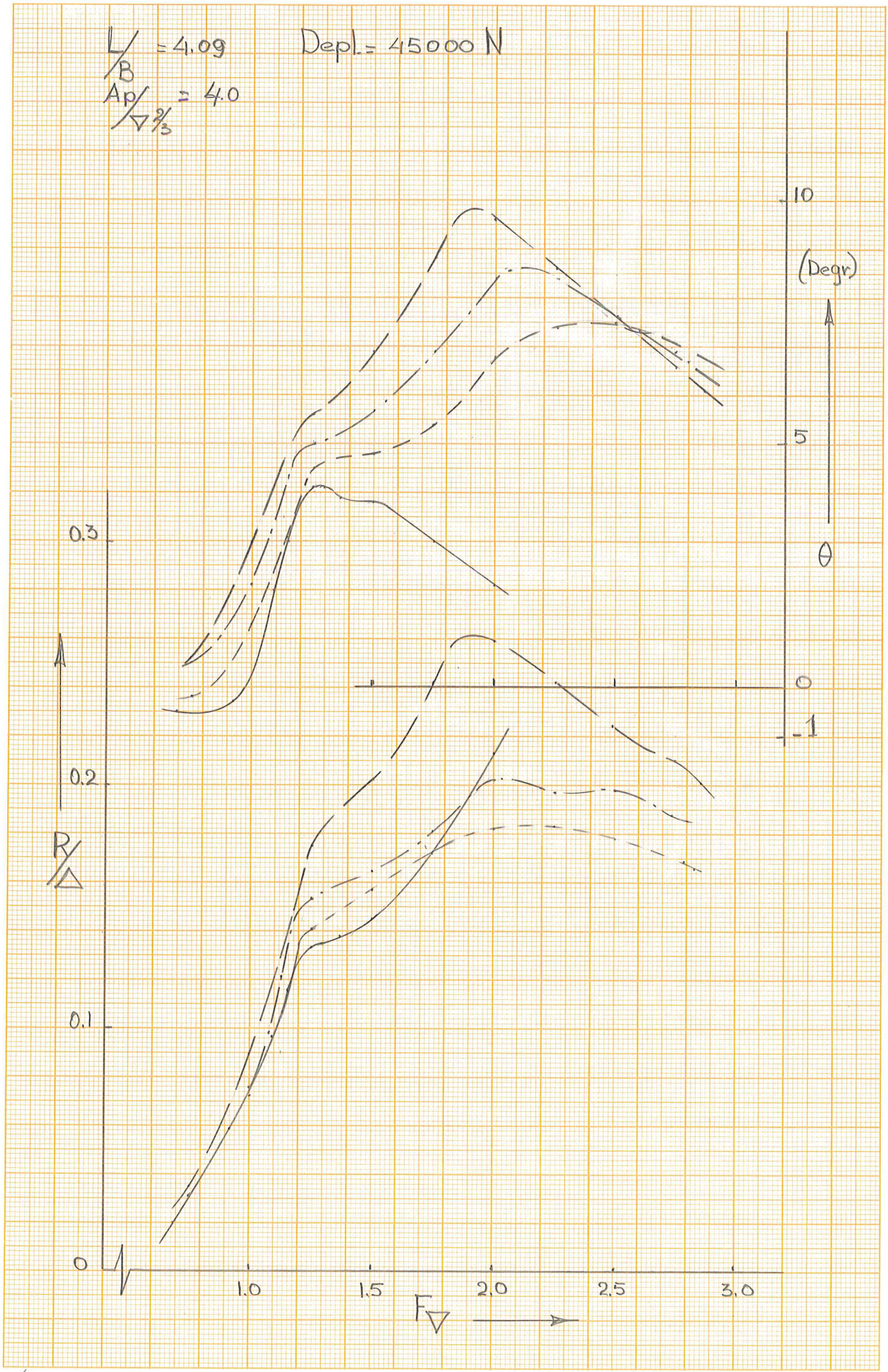

L/B = 4.09
Depl = 45000 N
Ap/∇^2/3 = 4.0
10
(Degr)
5
θ
0
-1
0.3
0.2
R/Δ
0.1
0
1.0
1.5
2.0
2.5
3.0
F∇

fig 10 L

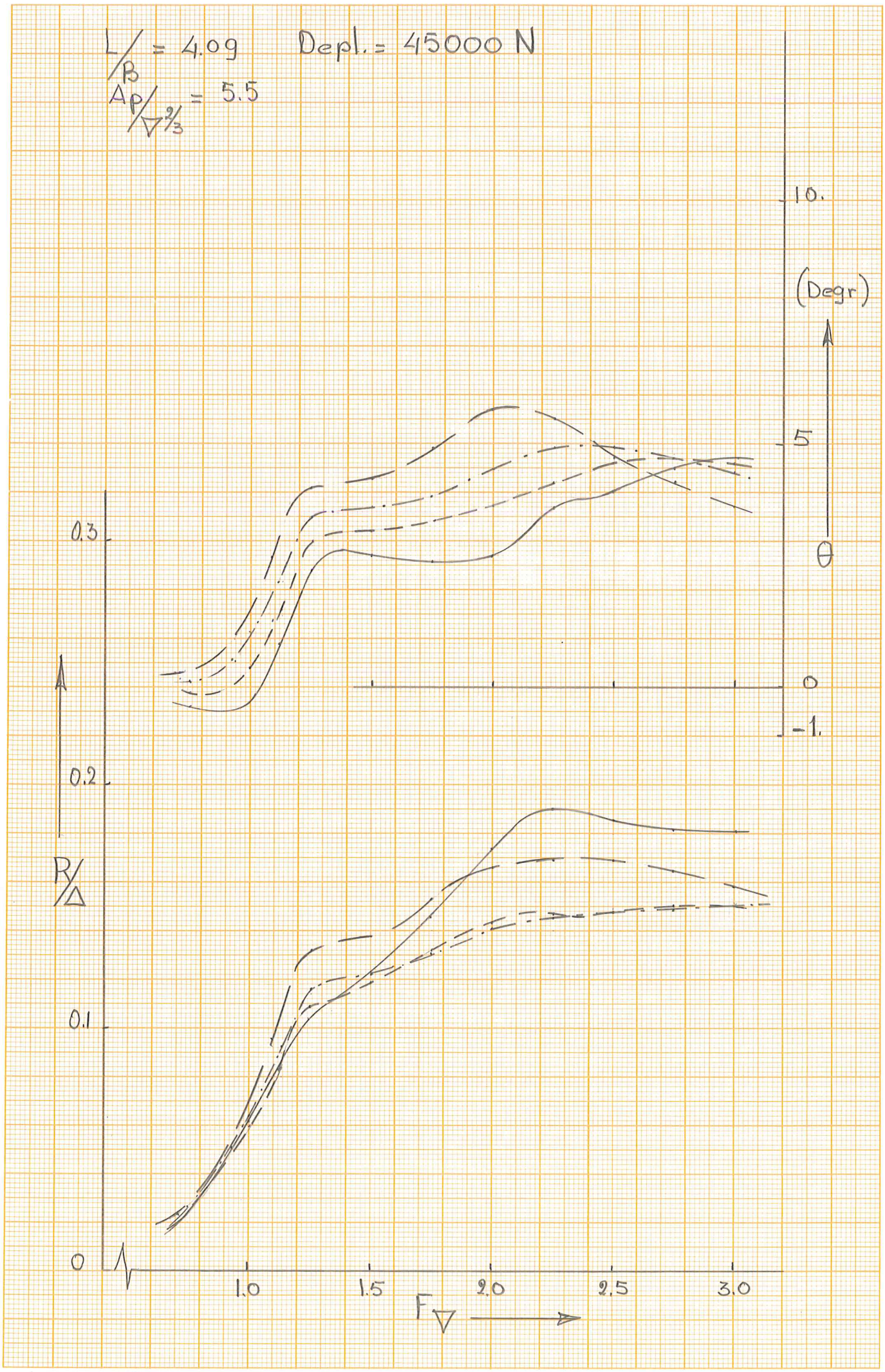

L/B = 4.09
Depl. = 45000 N
Ap/∇2/3 = 5.5
10.
(Degr)
5
θ
0
-1.
0.3
0.2
0.1
0
R/Δ
1.0
1.5
2.0
2.5
3.0
F∇

fig 10 R.

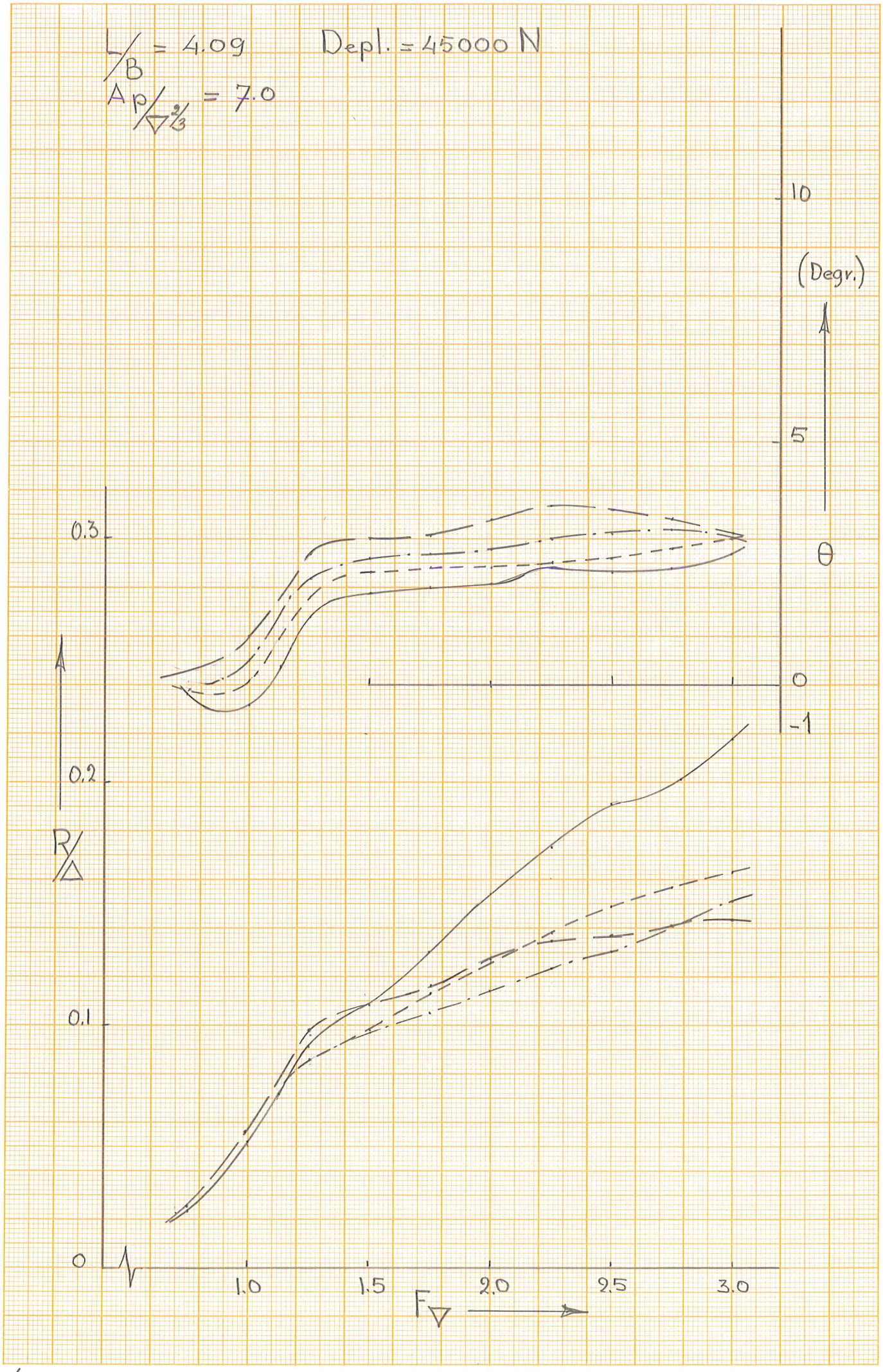

L/B = 4.09
Dépl. = 45000 N
Ap/∇^2/3 = 7.0
10
(Degr.)
5
θ
0
-1
0.3
0.2
R/Δ
0.1
0
1.0
1.5
2.0
2.5
3.0
F∇

fig 10 vers. L

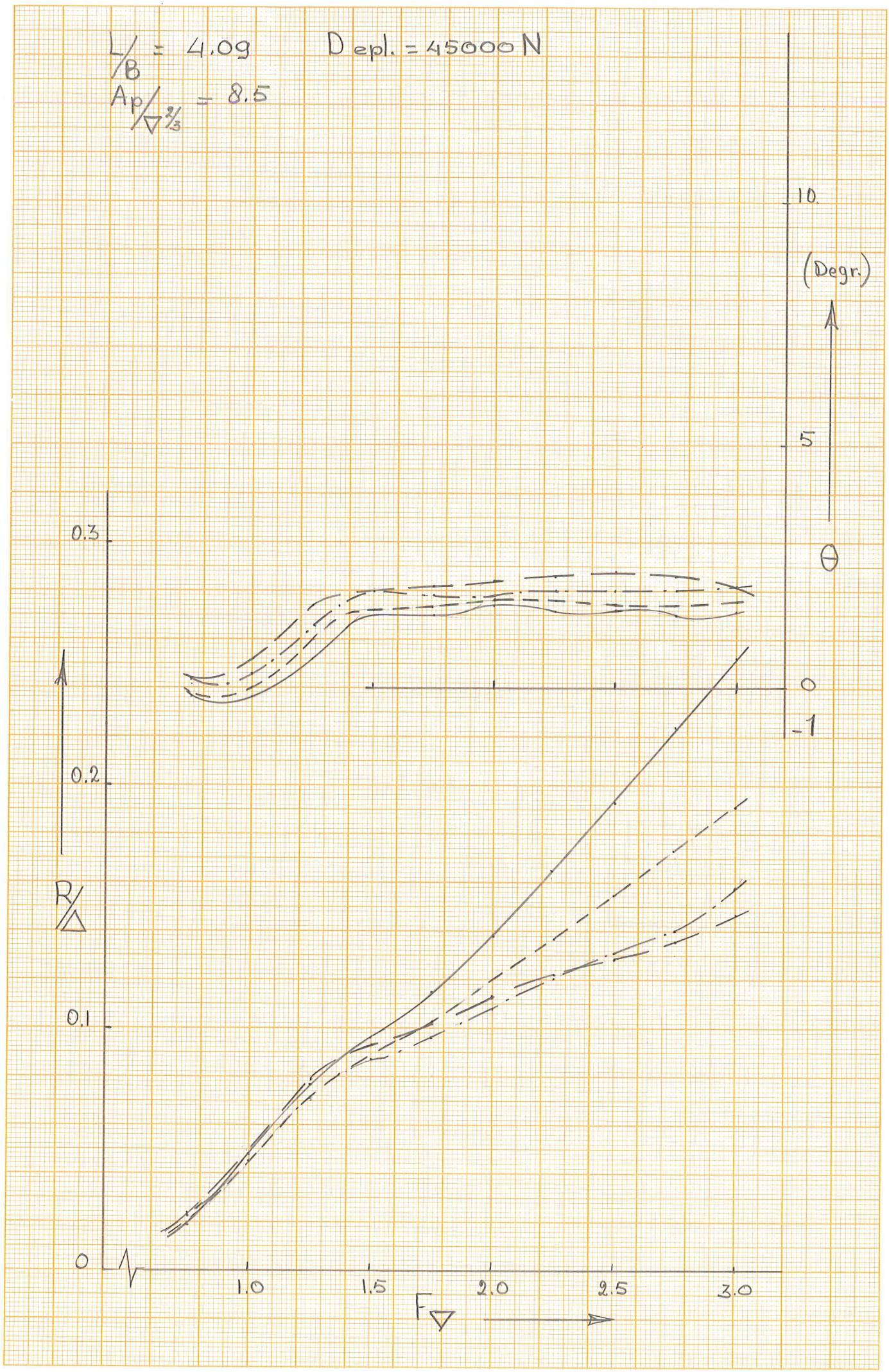

L/B = 4.09
Depl. = 45000 N
Ap/∇2/3 = 8.5
10
(Degr.)
5
θ
0
-1
0.3
0.2
0.1
0
R/Δ
1.0
1.5
2.0
2.5
3.0
F∇

fig 10 verw. R.

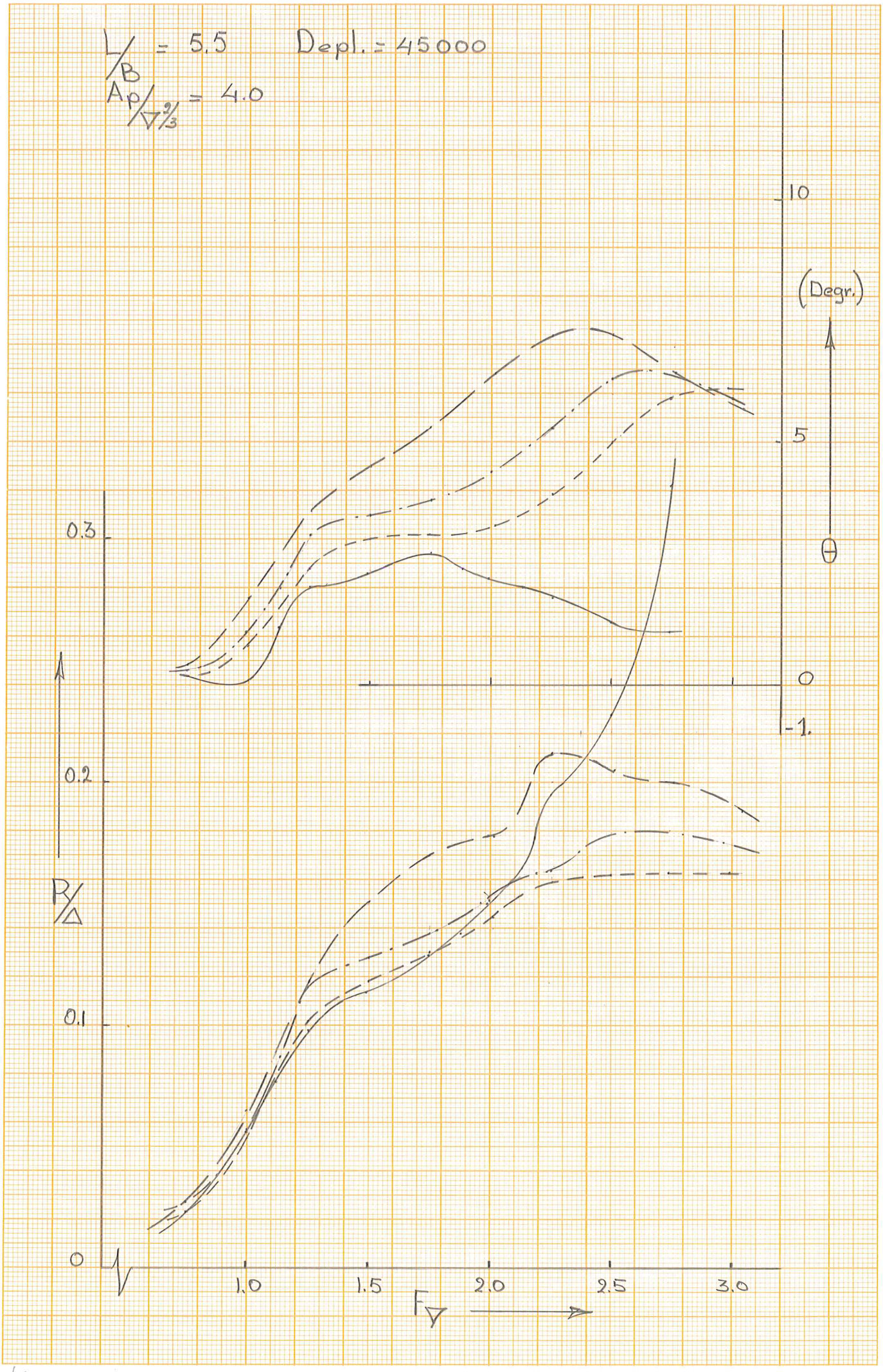


fig 11 -L-

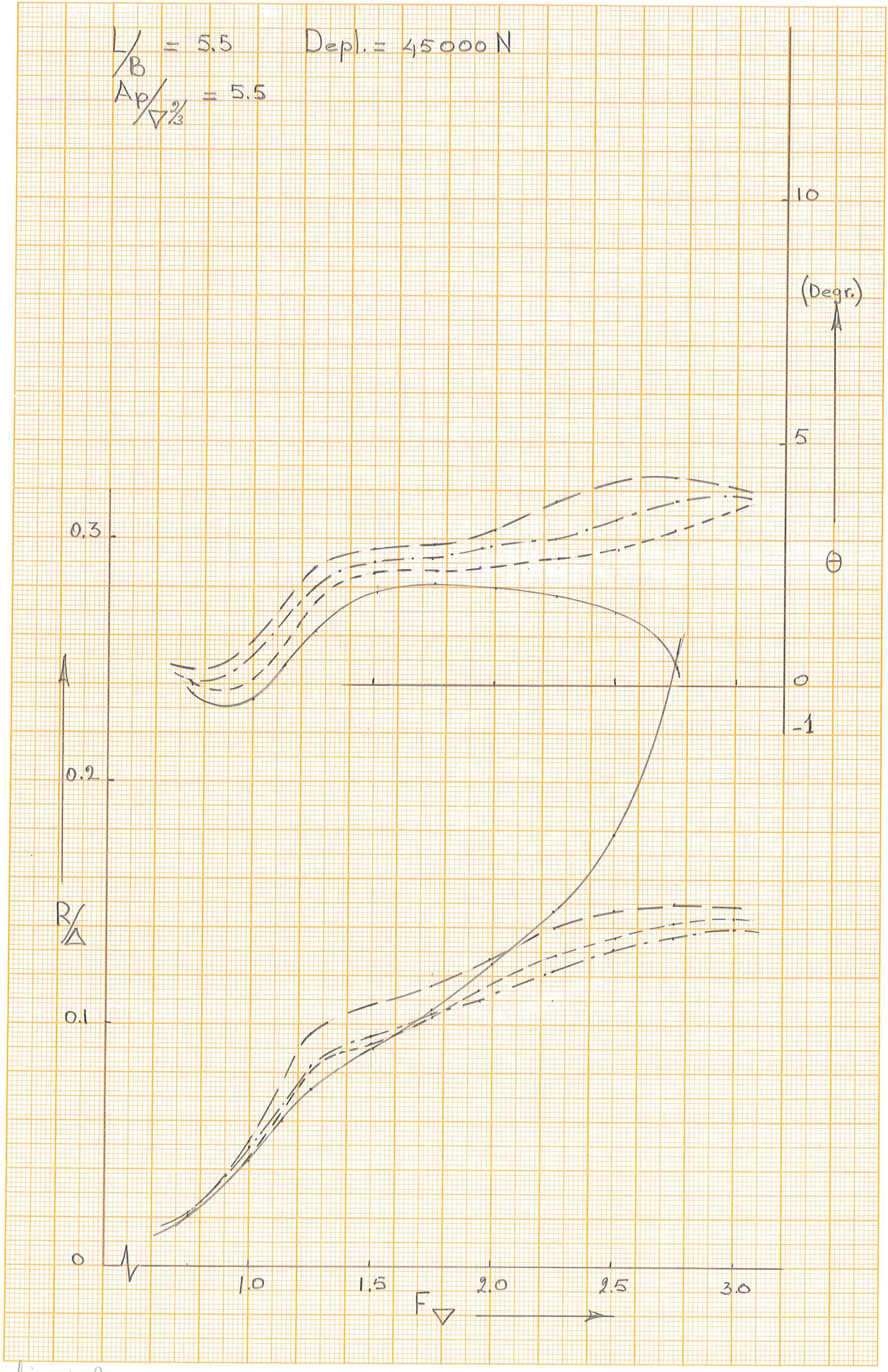

L/B = 5.5
Depl. = 45000 N
Ap/∇^2/3 = 5.5
10
(Degr.)
5
θ
0
-1
0.3
0.2
R/Δ
0.1
0
1.0
1.5
2.0
2.5
3.0
F∇

fig 11 R.

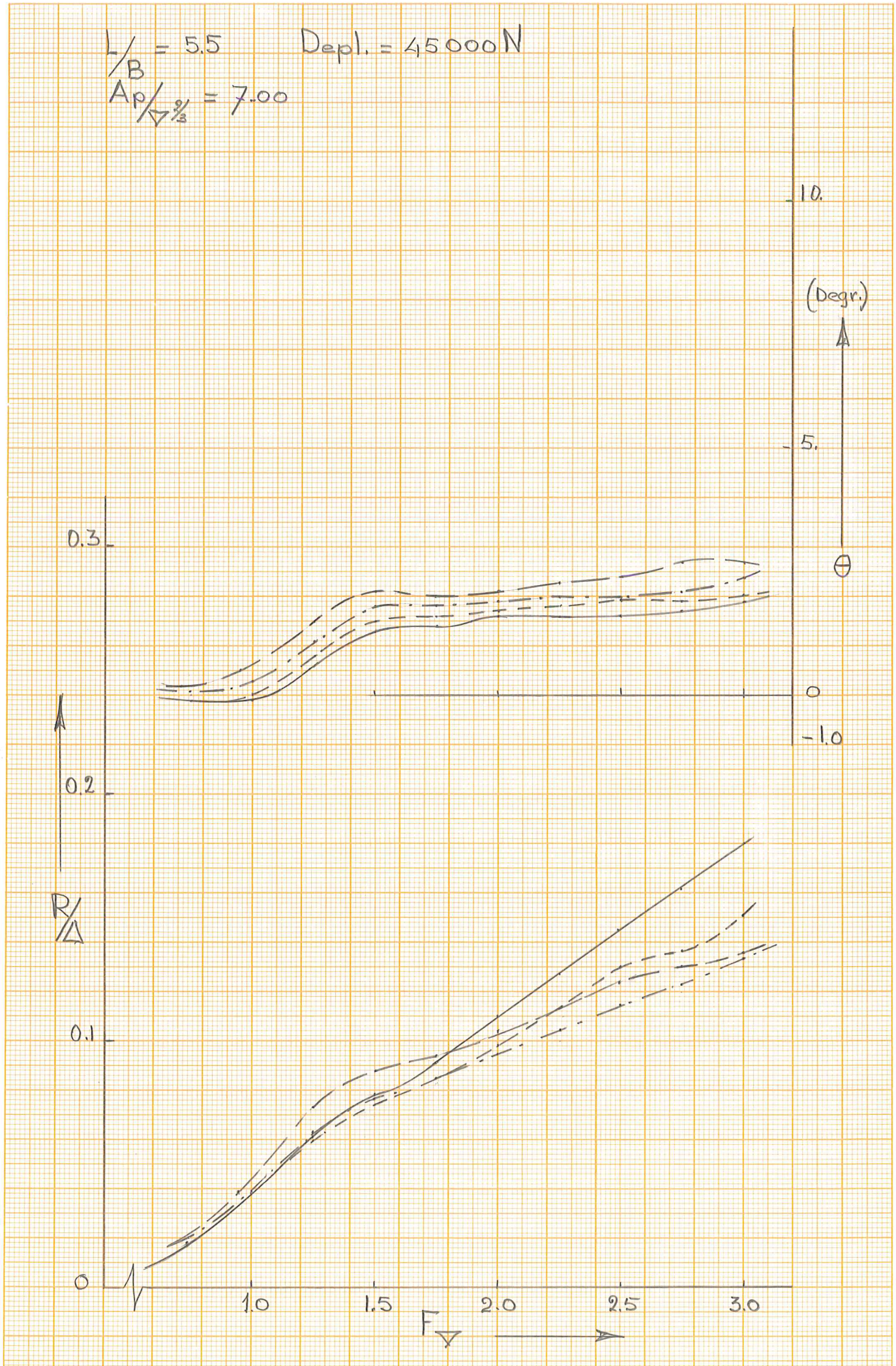

L/B = 5.5
Depl. = 45000 N
Ap/▽2/3 = 7.00
10.
(Degr.)
5.
θ
0
-1.0
0.3
0.2
R/Δ
0.1
0
1.0
1.5
2.0
2.5
3.0
F▽

fig 11 vew. L

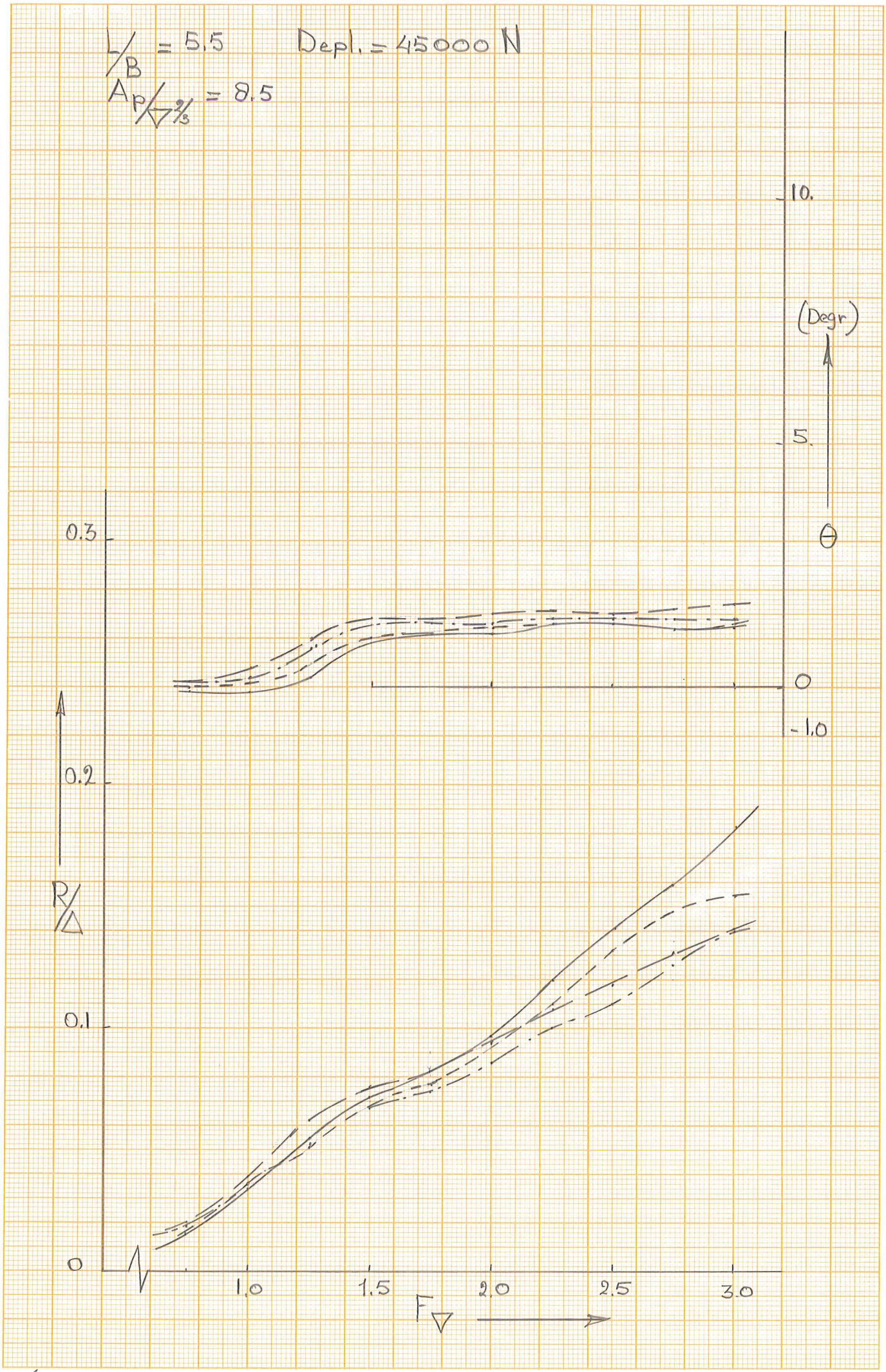

L/B = 5.5
Depl. = 45000 N
Ap/∇^2/3 = 8.5
10.
(Degr)
5.
θ
0.3
0
-1.0
0.2
R/Δ
0.1
0
1.0
1.5
2.0
2.5
3.0
F∇

fig 11 verw. R.

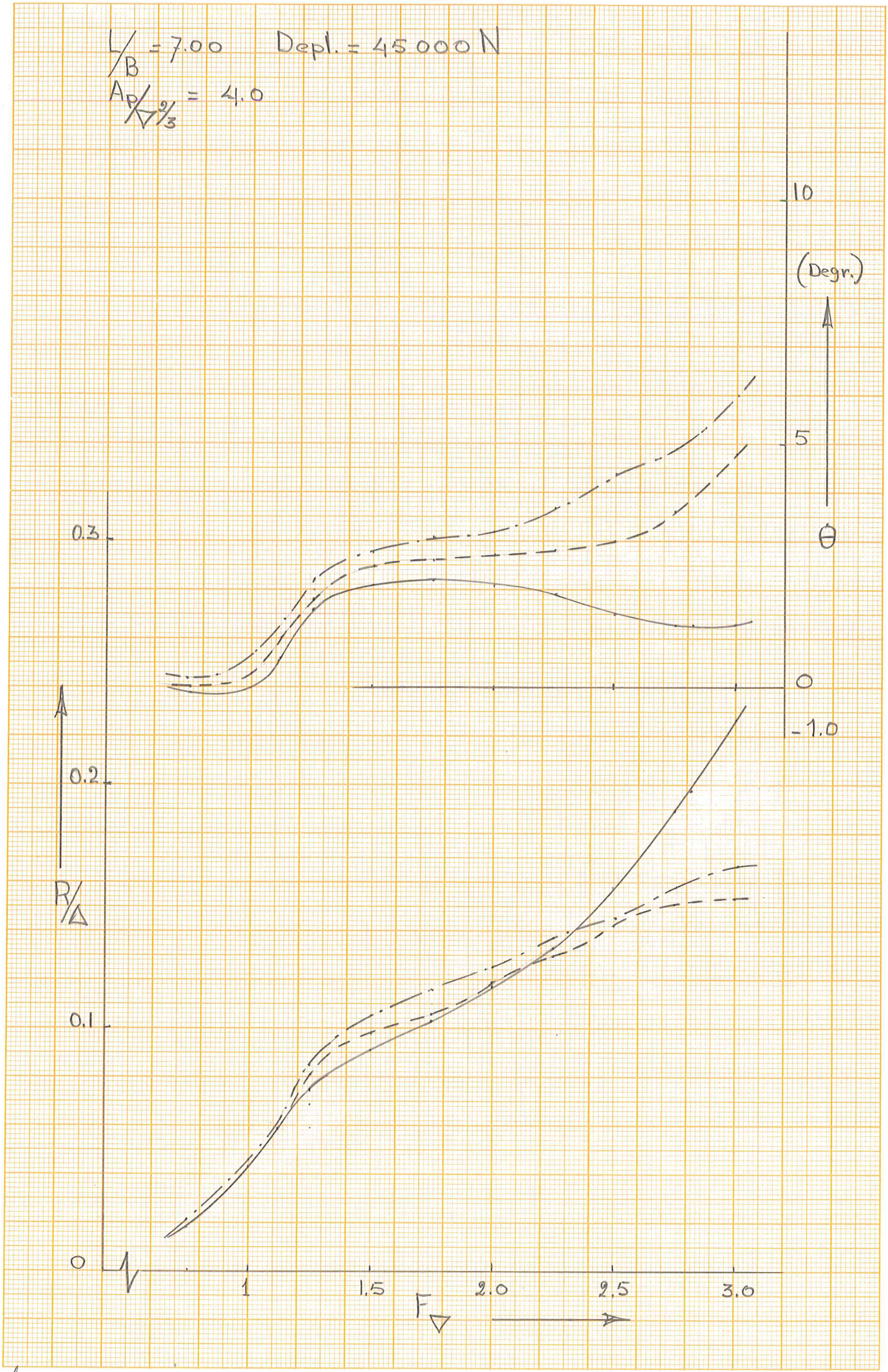

L/B = 7.00
Depl. = 45000 N
AP/▽2/3 = 4.0
10
(Degr.)
5
θ
0
-1.0
0.3
0.2
0.1
0
R/Δ
1
1.5
2.0
2.5
3.0
F▽

fig 12 L

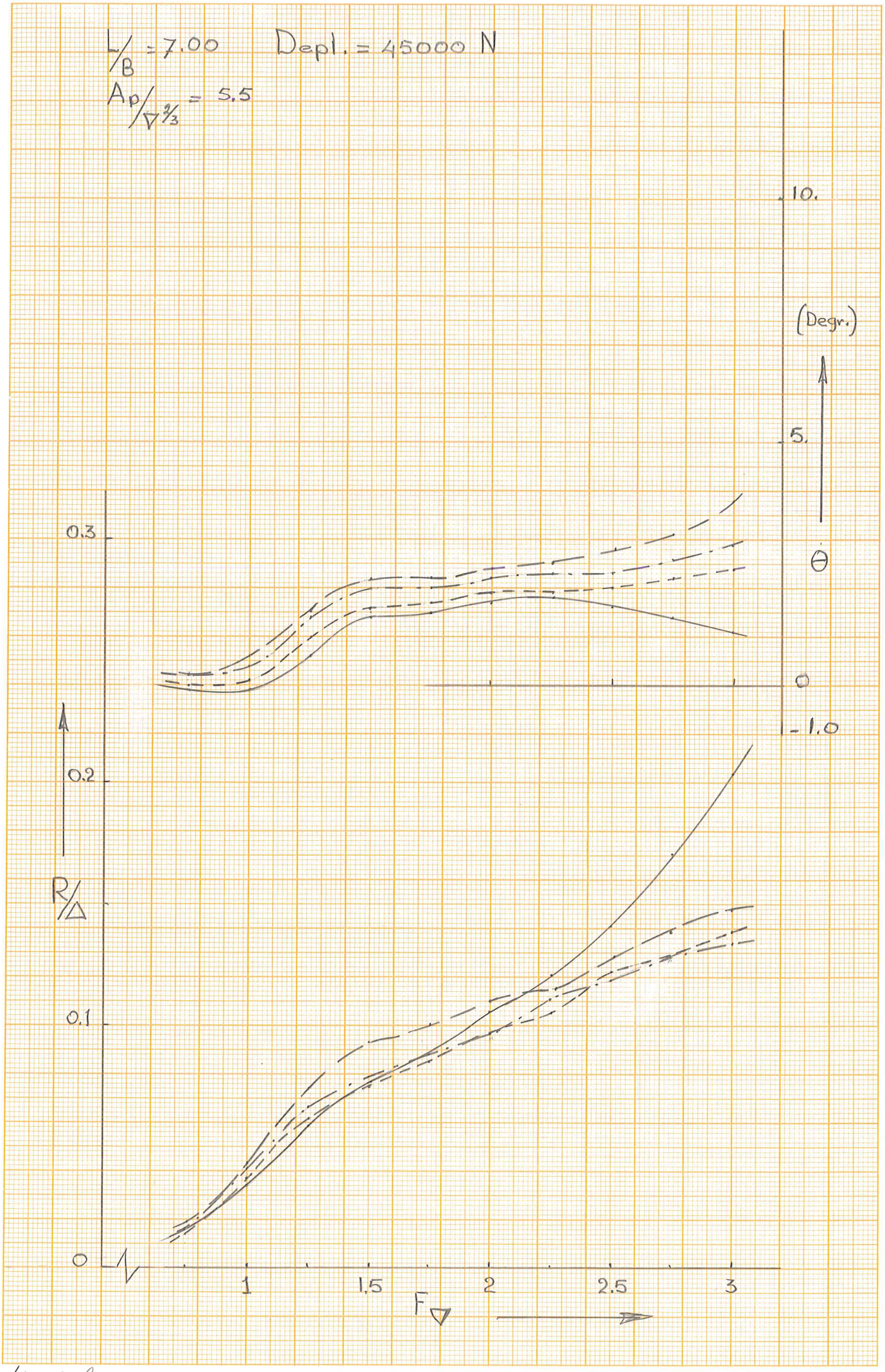


fig 12 R.

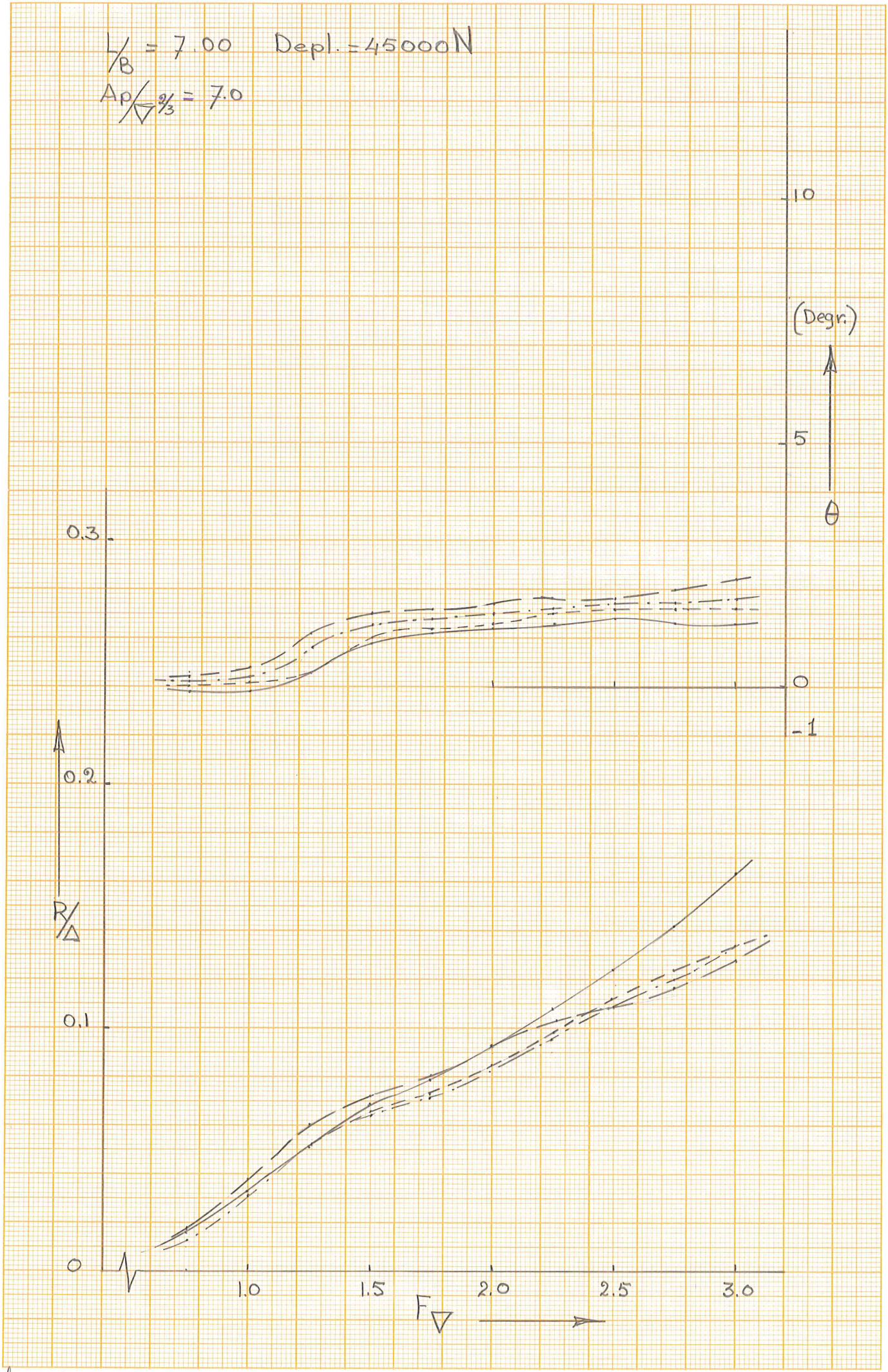

L/B = 7.00 Depl. = 45000N
Ap/∇2/3 = 7.0
10
(Degr.)
5
θ
0.3
0
-1
0.2
R/Δ
0.1
0
1.0
1.5
2.0
2.5
3.0
F∇

fig 12 vers. L

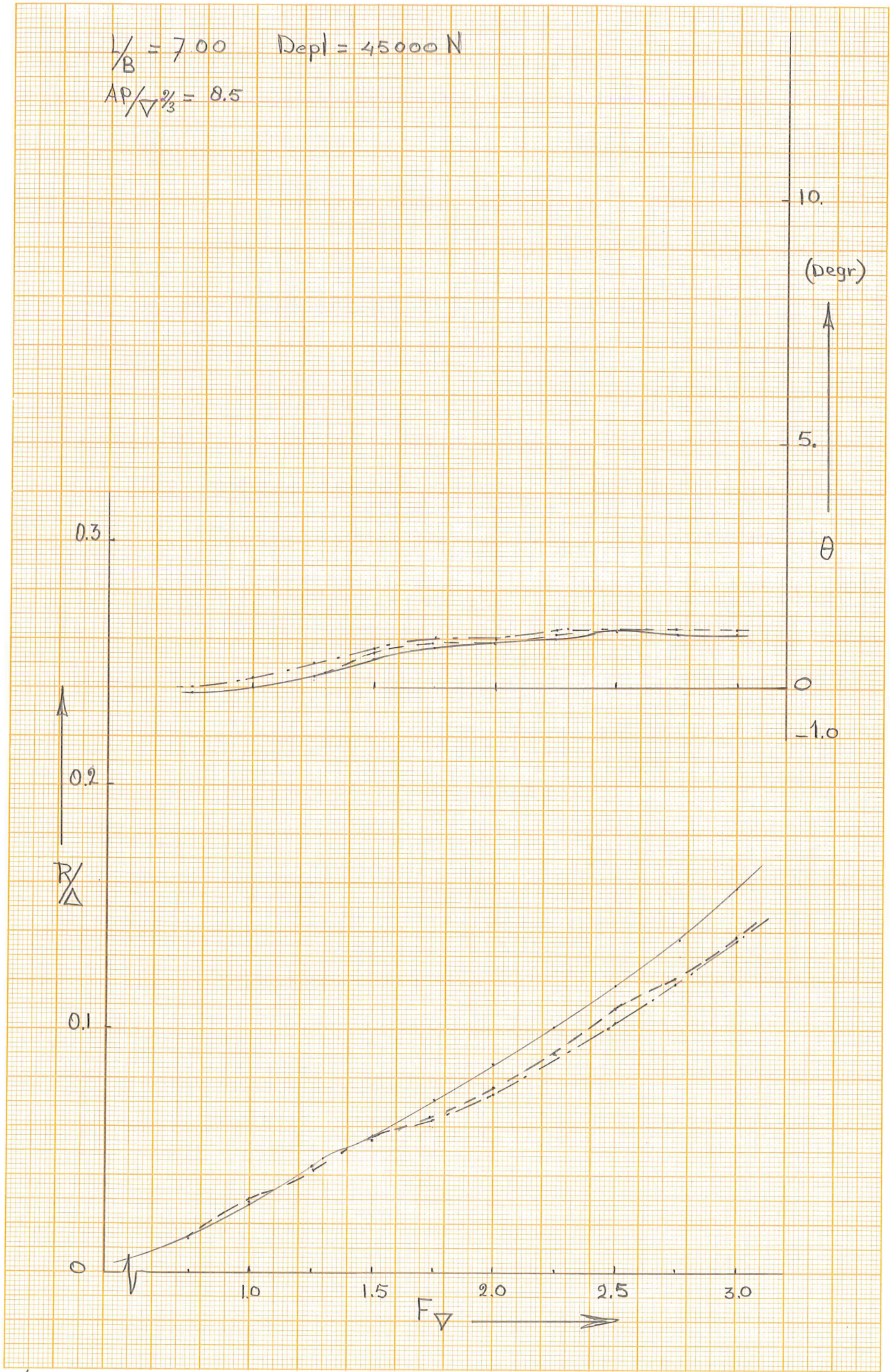

L/B = 7.00
Depl = 45000 N
AP/∇^2/3 = 8.5
10.
(Degr)
5.
θ
0
-1.0
0.3
0.2
0.1
R/Δ
0
1.0
1.5
2.0
2.5
3.0
F∇

fig 12 verw. R.


L/B = 2.0
Ap/∇^2/3 = 4.0
Depl. = 450.000 N
10
(Degr.)
5
θ
0
-1
0.3
0.2
0.1
0
R/Δ
1.0
1.5
2.0
2.5
3.0
F∇

fig 13 L

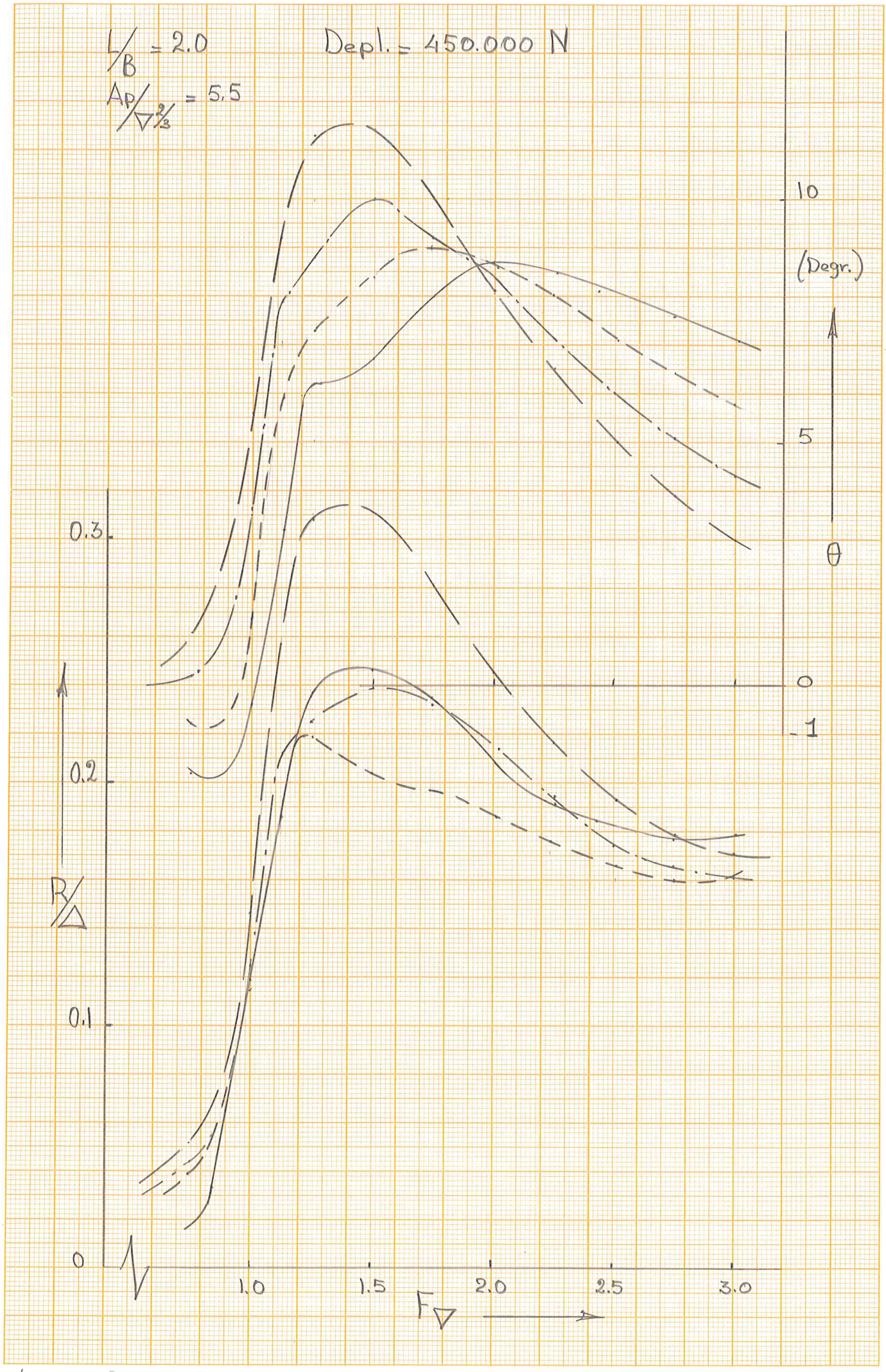

L/B = 2.0
Depl. = 450.000 N
Ap/∇^2/3 = 5.5
10
(Degr.)
5
θ
0
-1
0.3
0.2
R/Δ
0.1
0
1.0
1.5
2.0
2.5
3.0
F∇

fig 13 R.

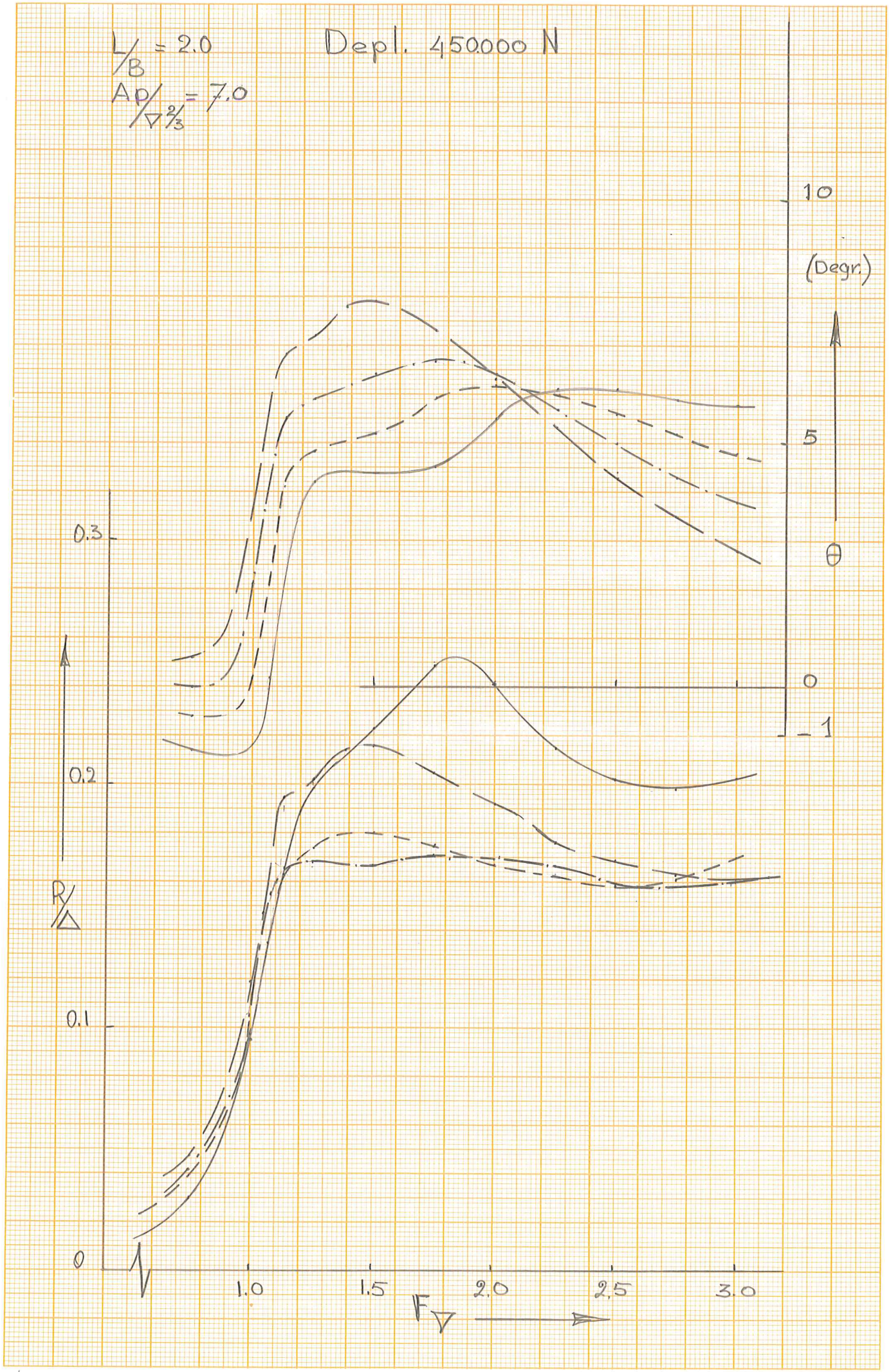

L/B = 2.0
Ap/∇2/3 = 7.0
Depl. 450000 N
10
(Degr.)
5
θ
0
-1
0.3
0.2
0.1
0
R/Δ
1.0
1.5
2.0
2.5
3.0
F∇

fig 13 vww L.

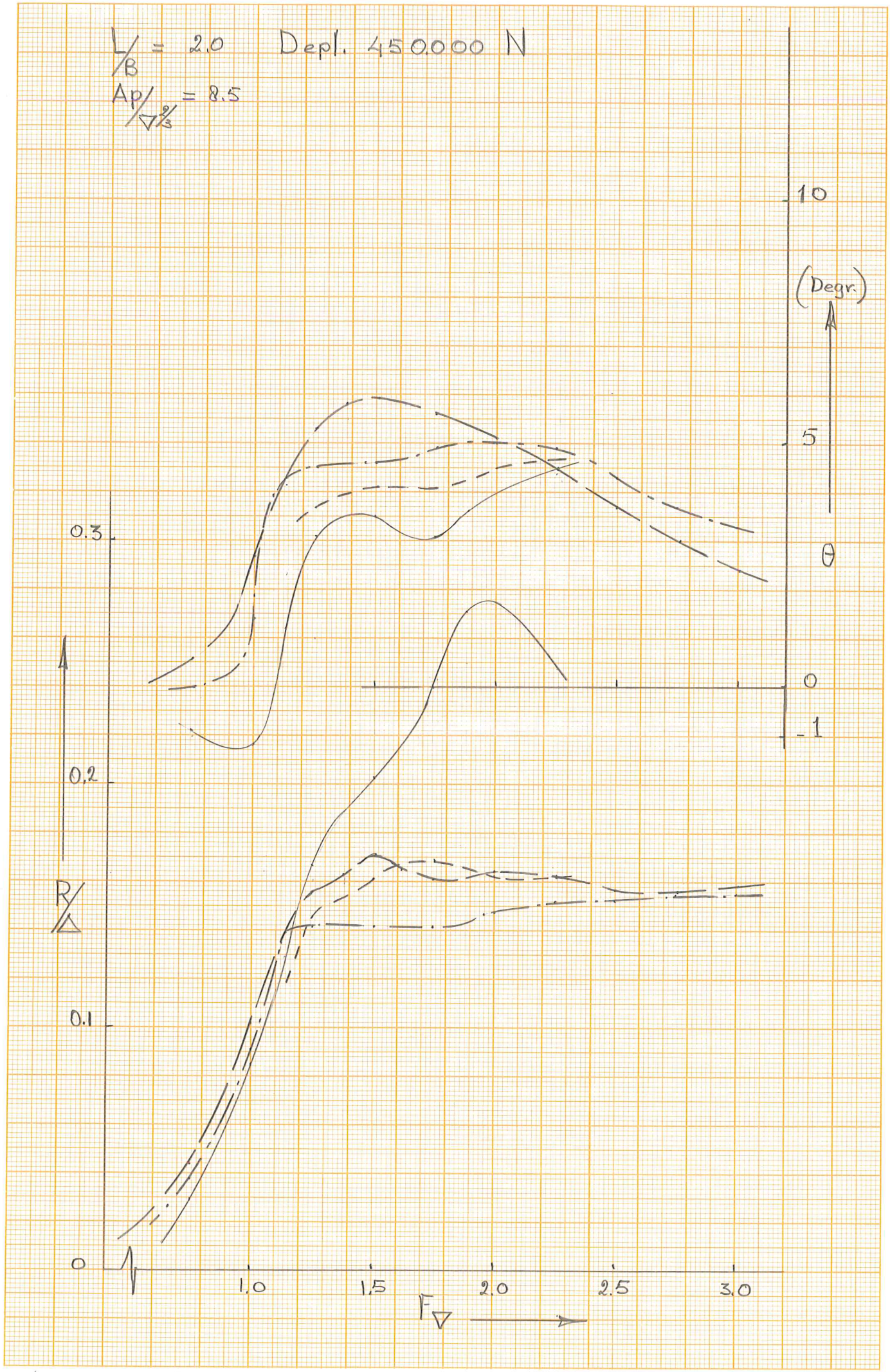

L/B = 2.0
Depl. 450.000 N
Ap/∇2/3 = 8.5
10
(Degr.)
5
θ
0
-1
0.3
0.2
R/Δ
0.1
0
1.0
1.5
2.0
2.5
3.0
F∇

fig 13 Prov. R.

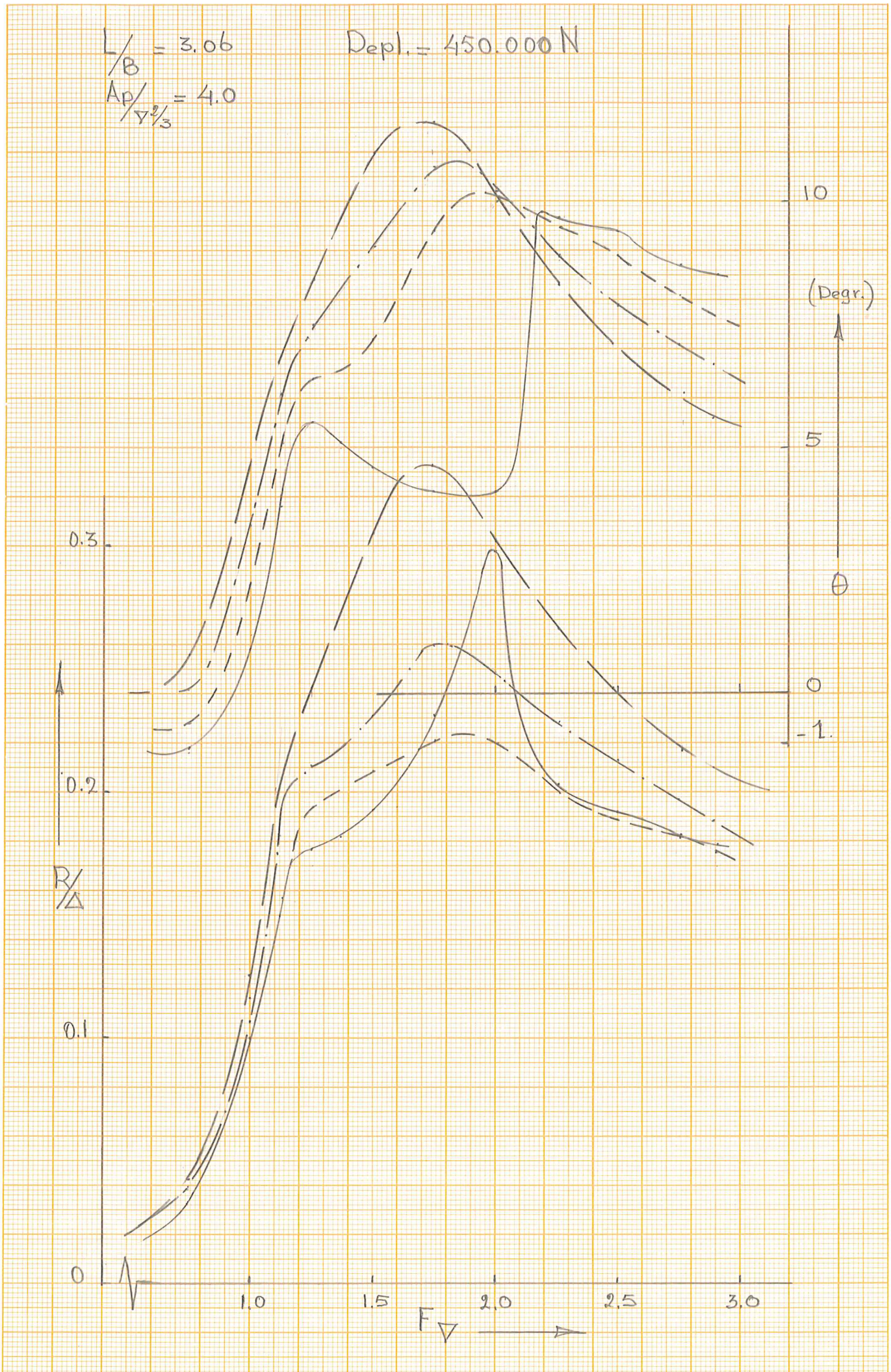

L/B = 3.06
Ap/∇^2/3 = 4.0
Depl. = 450.000 N
10
(Degr.)
5
θ
0
-1.
0.3
0.2
0.1
0
R/Δ
1.0
1.5
2.0
2.5
3.0
F∇

fig 14 L

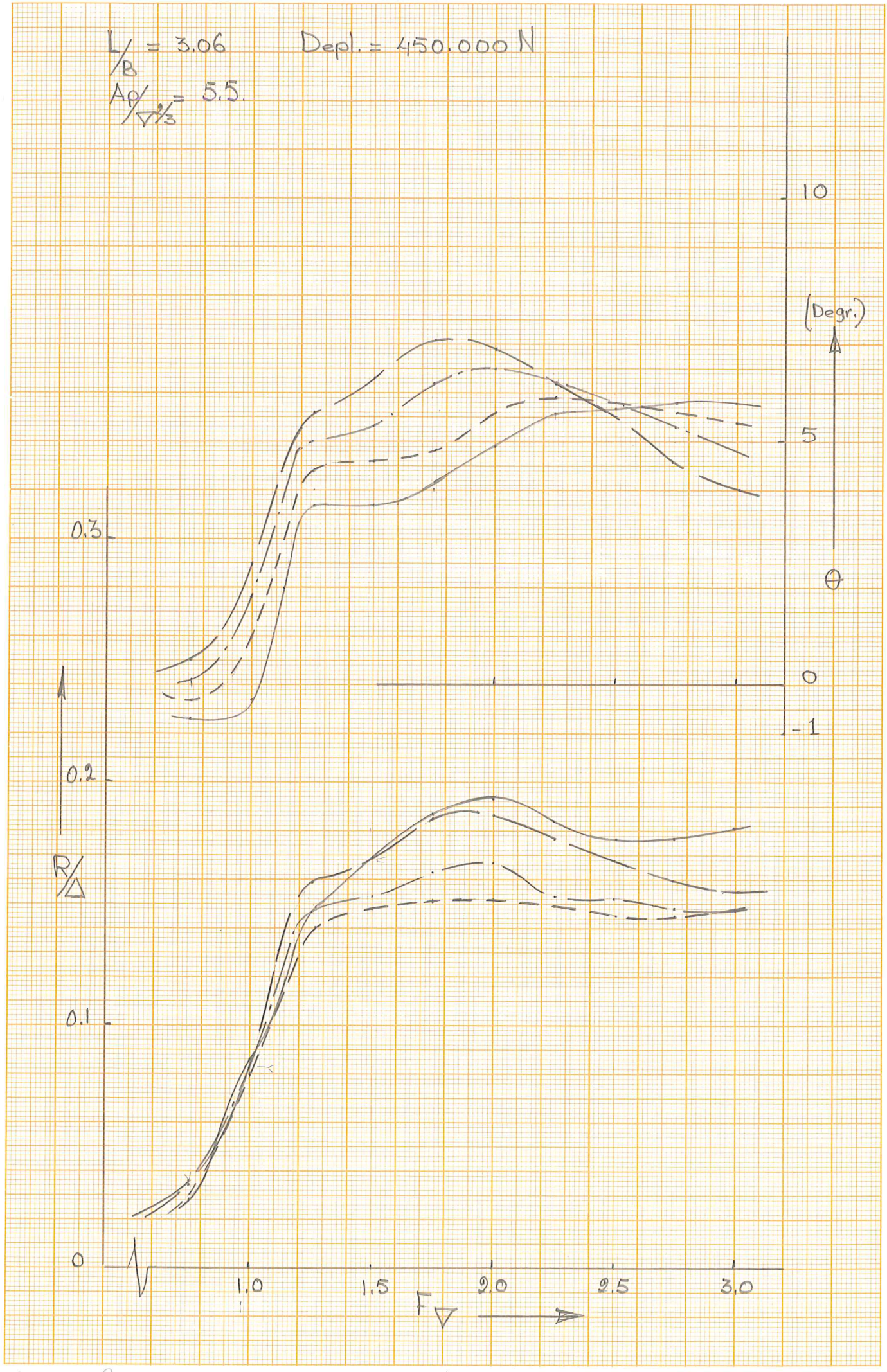

L/B = 3.06
Depl. = 450.000 N
Aφ/∇^2/3 = 5.5.
10
5
0
-1
(Degr.)
θ
0.3
0.2
0.1
0
R/Δ
1.0
1.5
2.0
2.5
3.0
F∇

fig 14 R.

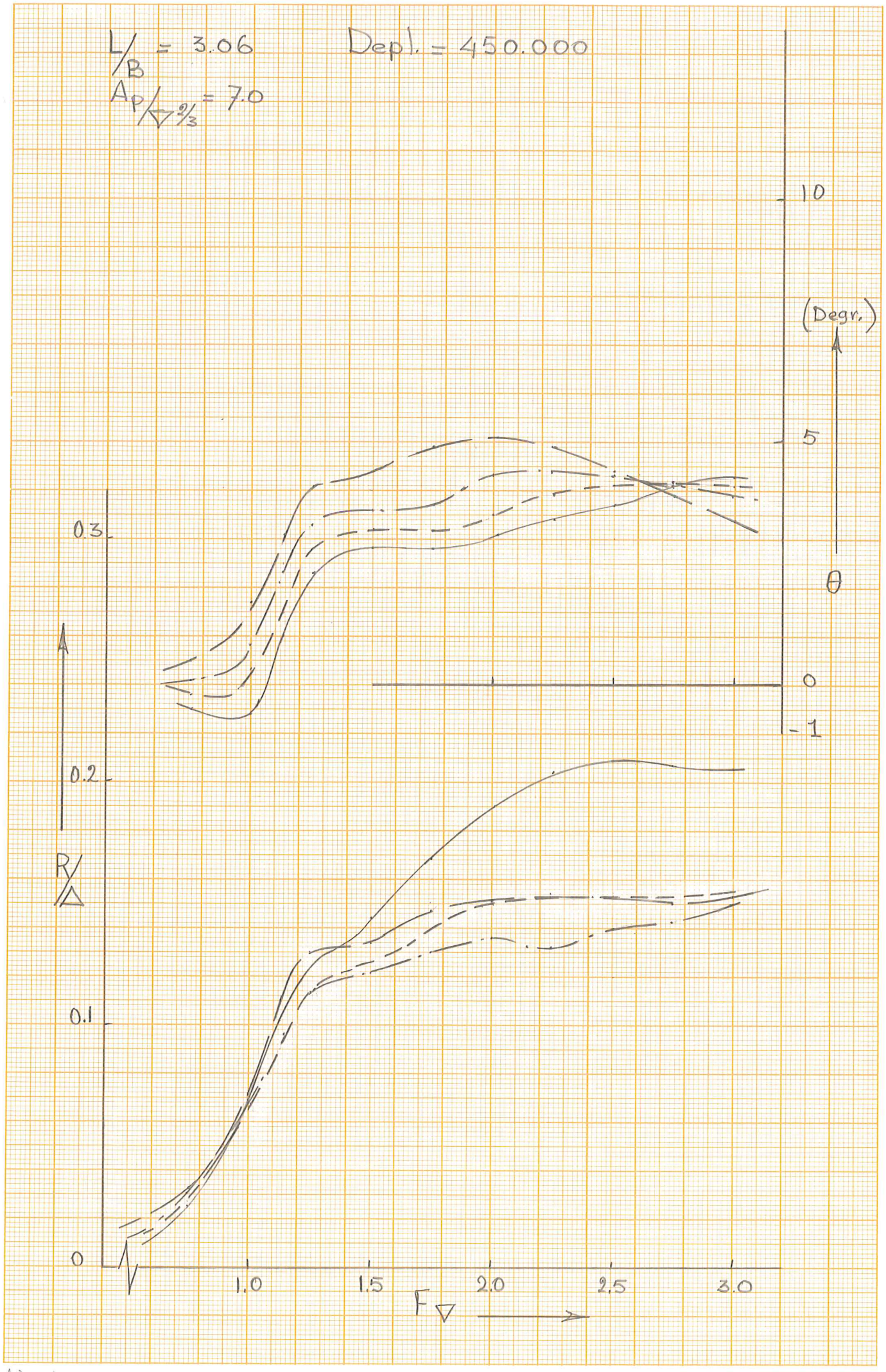

L/B = 3.06
Depl. = 450.000
Ap/∇^2/3 = 7.0
10
(Degr.)
5
θ
0
-1
0.3
0.2
R/Δ
0.1
0
1.0
1.5
2.0
2.5
3.0
F∇

fig 14 verv. L

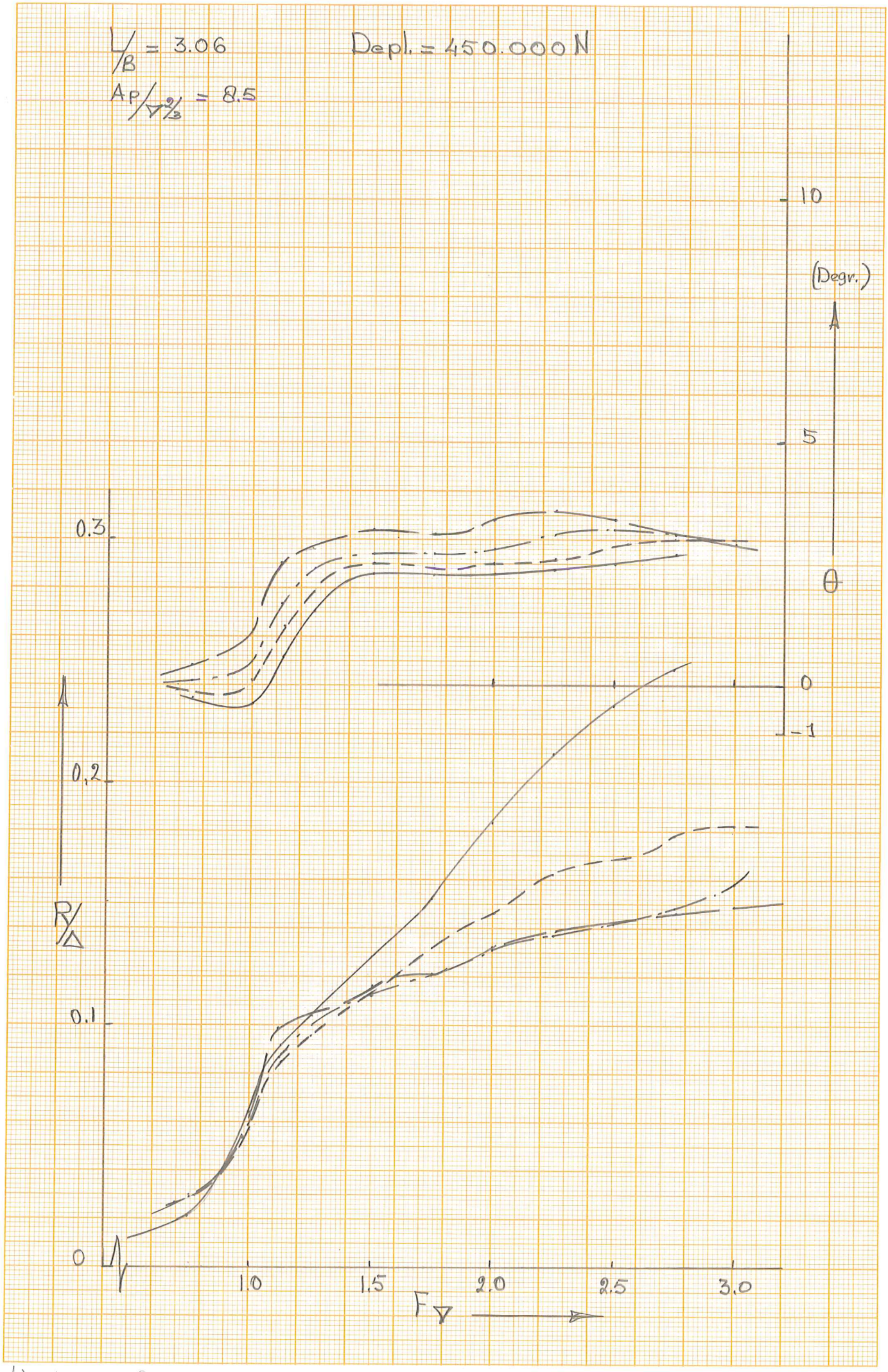

L/B = 3.06
Ap/∇2/3 = 8.5
Depl. = 450.000 N
10
(Degr.)
5
θ
0
-1
0.3
0,2
0.1
0
R/Δ
1.0
1.5
2.0
2.5
3.0
F∇

fig 14 vers. R

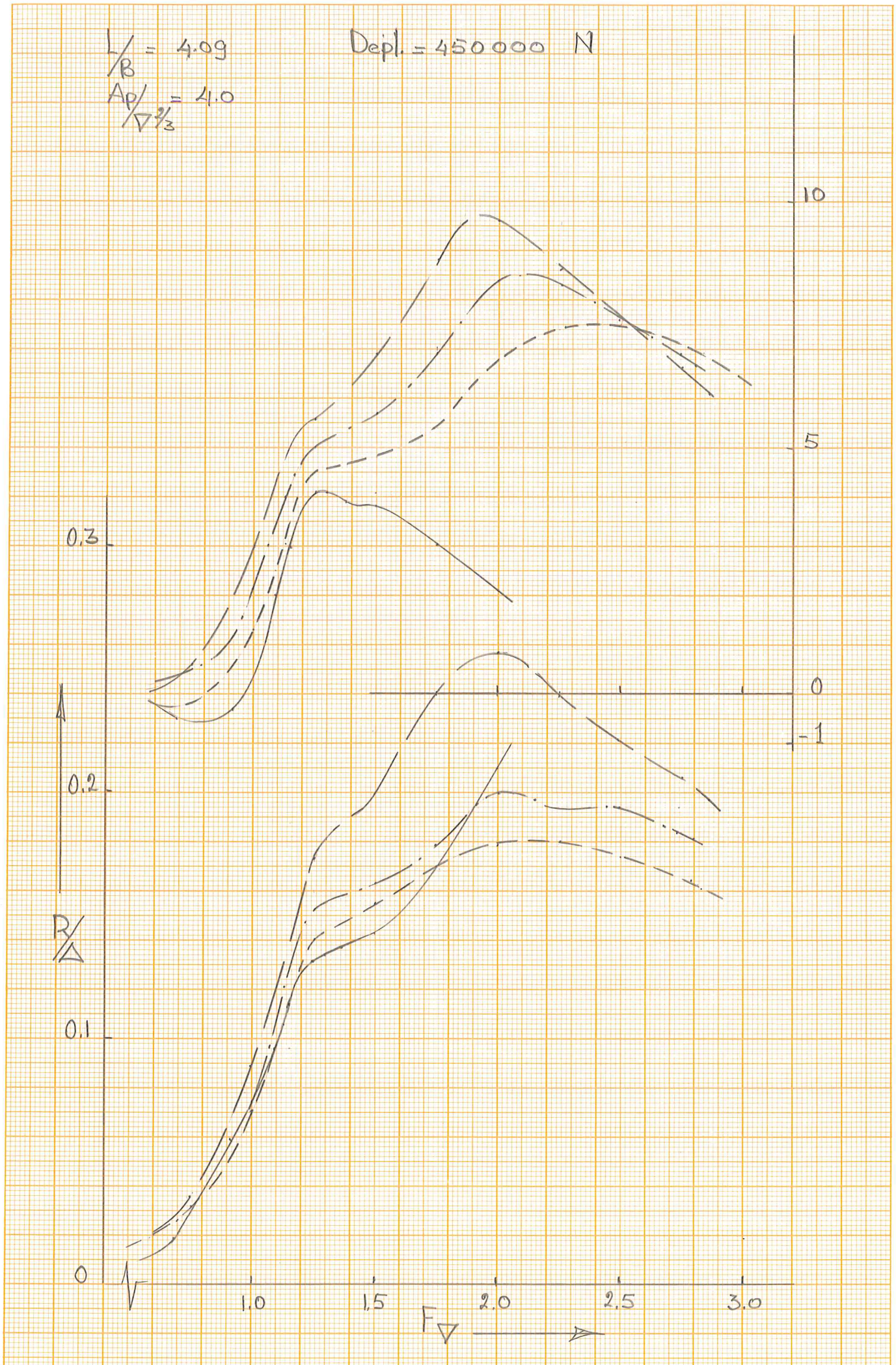


fig 15 L

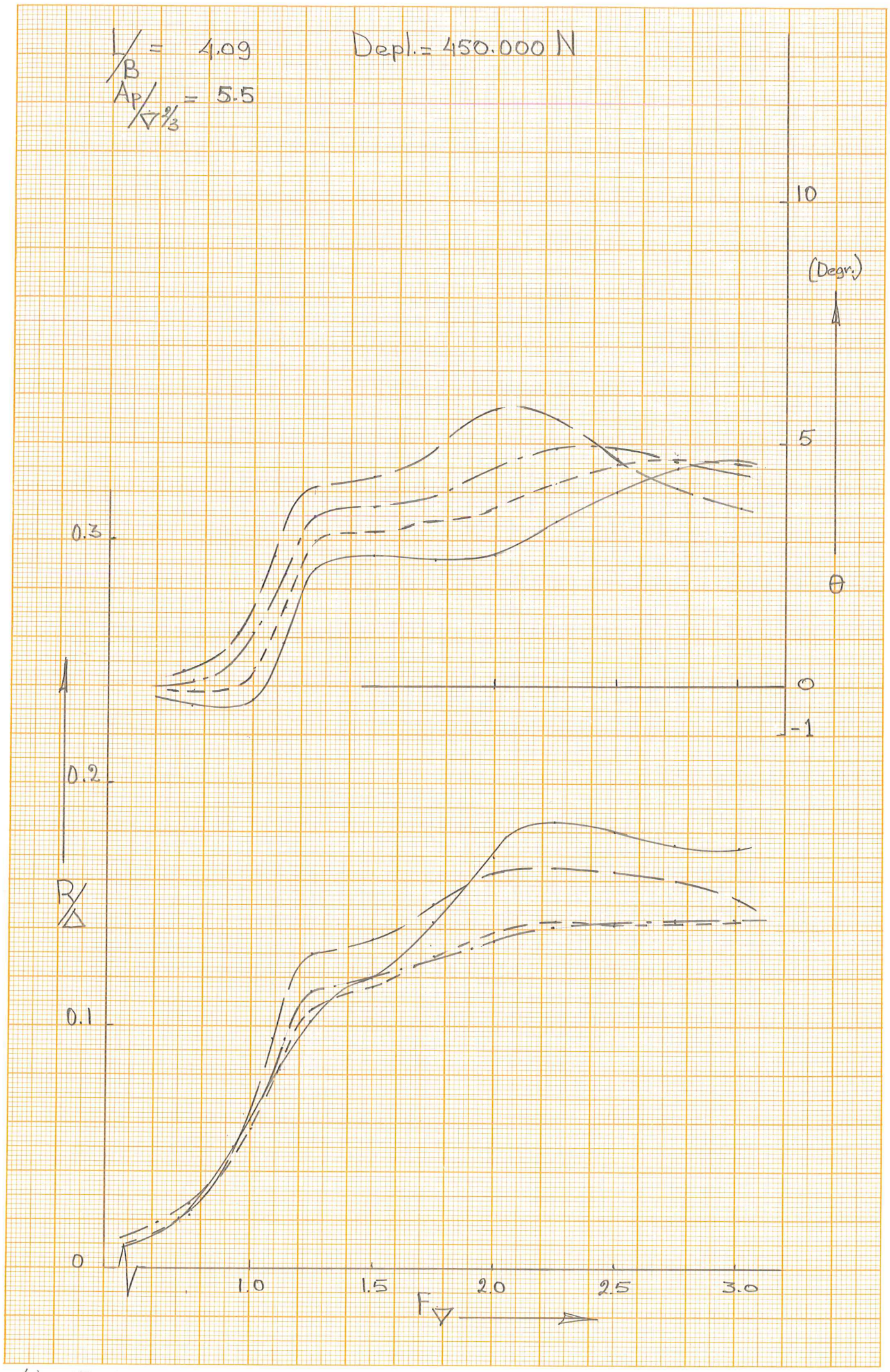

L/B = 4.09
Ap/∇^2/3 = 5.5
Depl.= 450.000 N
10
(Degr.)
5
θ
0
-1
0.3
0.2
R/Δ
0.1
0
1.0
1.5
2.0
2.5
3.0
F∇

fig 15 R

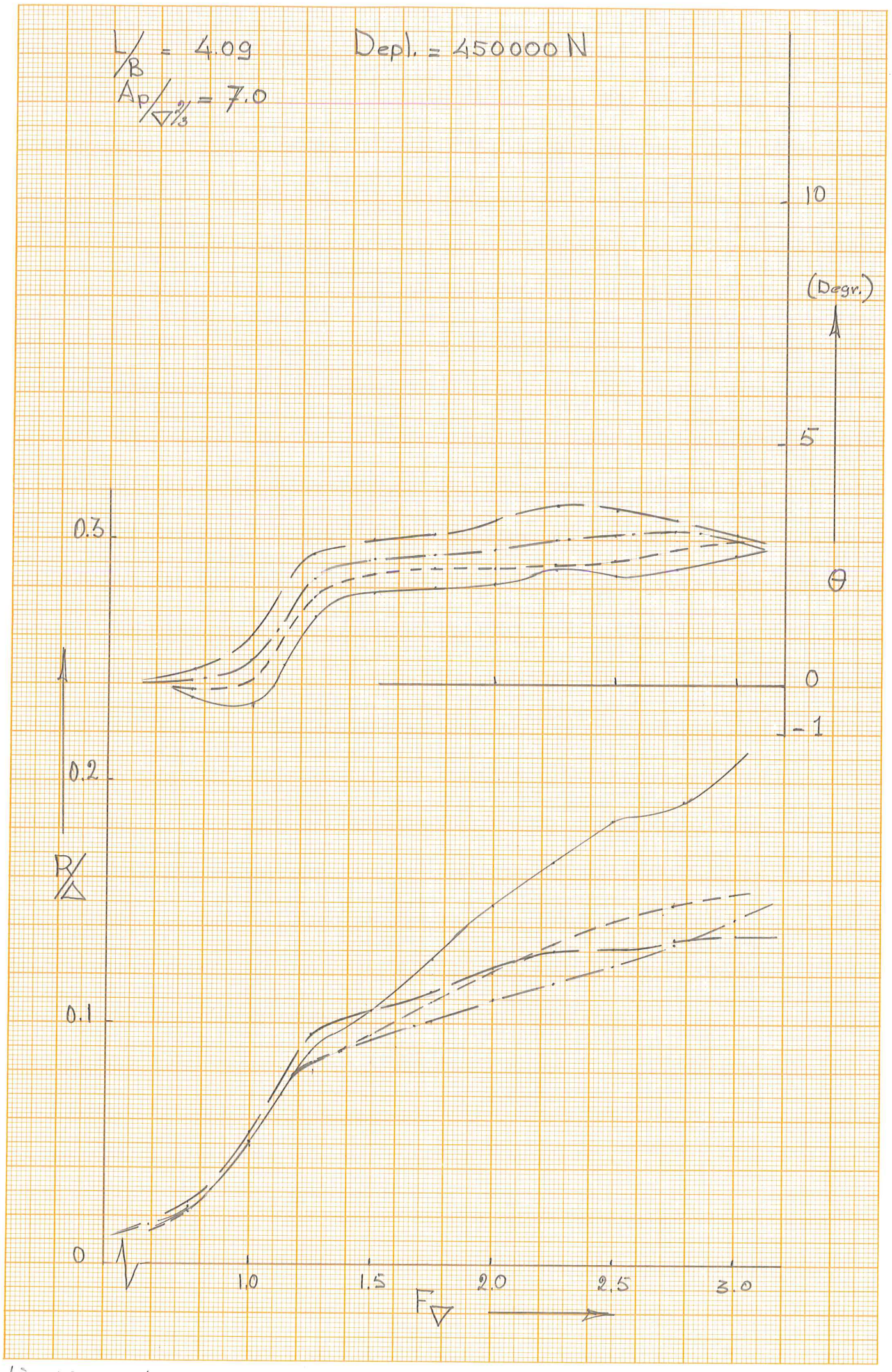

L/B = 4.09
Ap/∇^2/3 = 7.0
Depl. = 450000 N
10
(Degr.)
5
θ
0
-1
0.3
0.2
R/∇
0.1
0
1.0
1.5
2.0
2.5
3.0
F∇

fig 15 vew. L

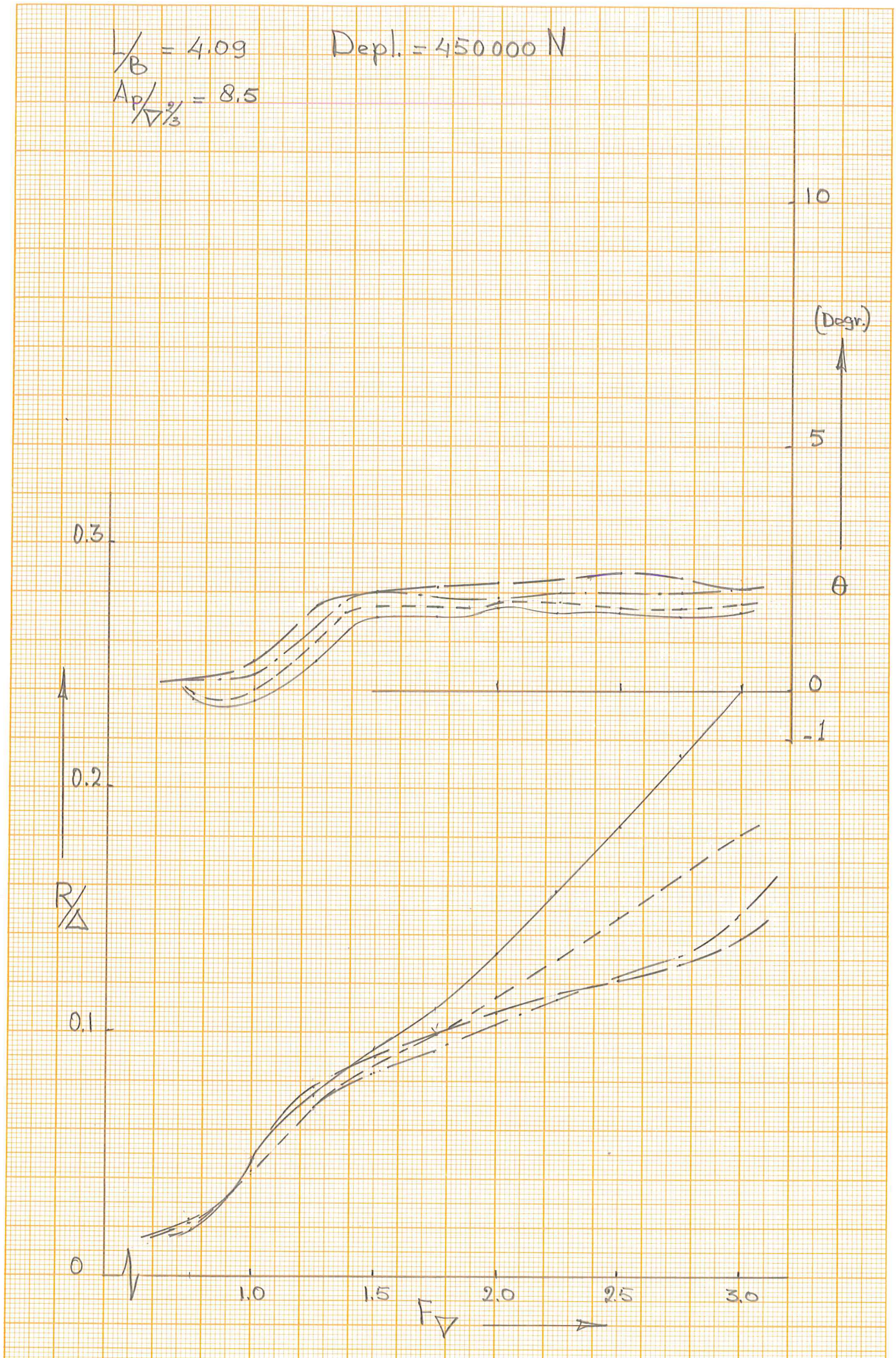

L/B = 4.09
Ap/∇^2/3 = 8.5
Depl. = 450000 N
10
(Degr.)
5
θ
0
-1
0.3
0.2
R/Δ
0.1
0
1.0
1.5
2.0
2.5
3.0
F∇

fig 15 van R.

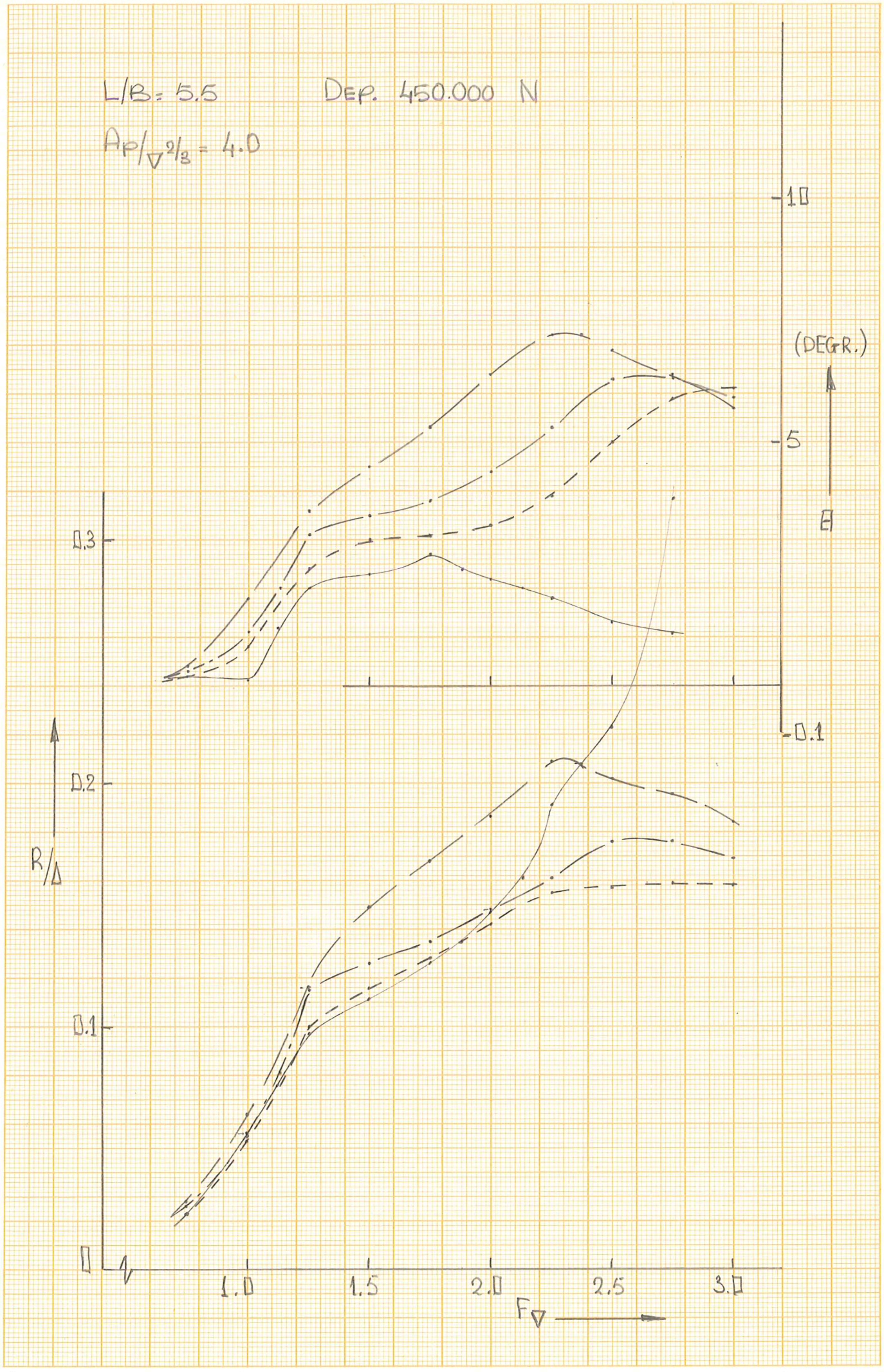

L/B = 5.5
DEP. 450.000 N
$A_P/\nabla^{2/3}$ = 4.0
-1.0
(DEGR.)
-5
E
-0.1
0.3
0.2
R/Δ
0.1
0
1.0
1.5
2.0
2.5
3.0
F_∇

fig 16 L

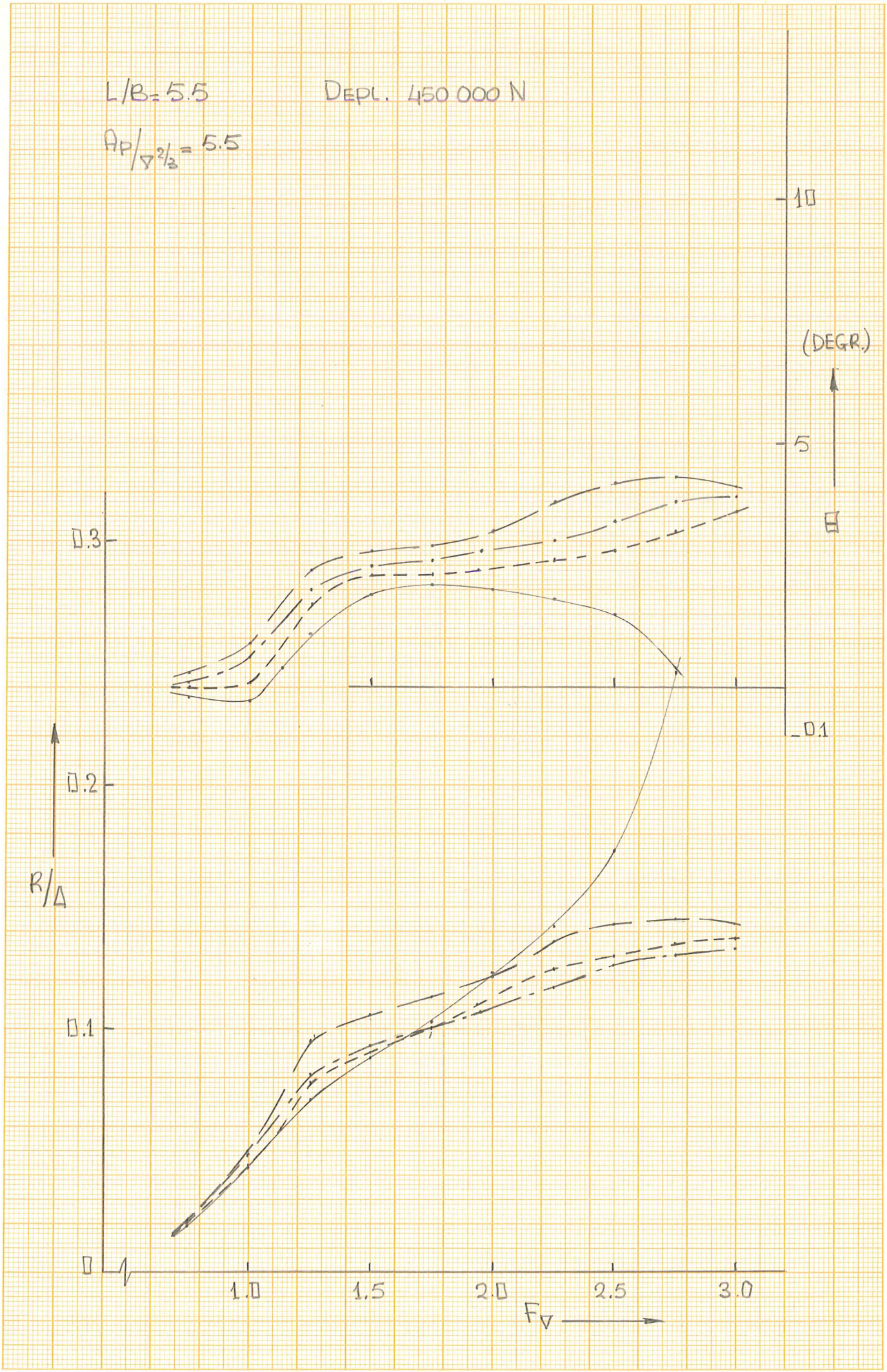

L/B = 5.5
DEPL. 450 000 N
$A_P/\nabla^{2/3} = 5.5$
10
(DEGR.)
5
0
0.3
0.2
0.1
0
R/Δ
0.1
1.0
1.5
2.0
2.5
3.0
F_∇

fig 16 R

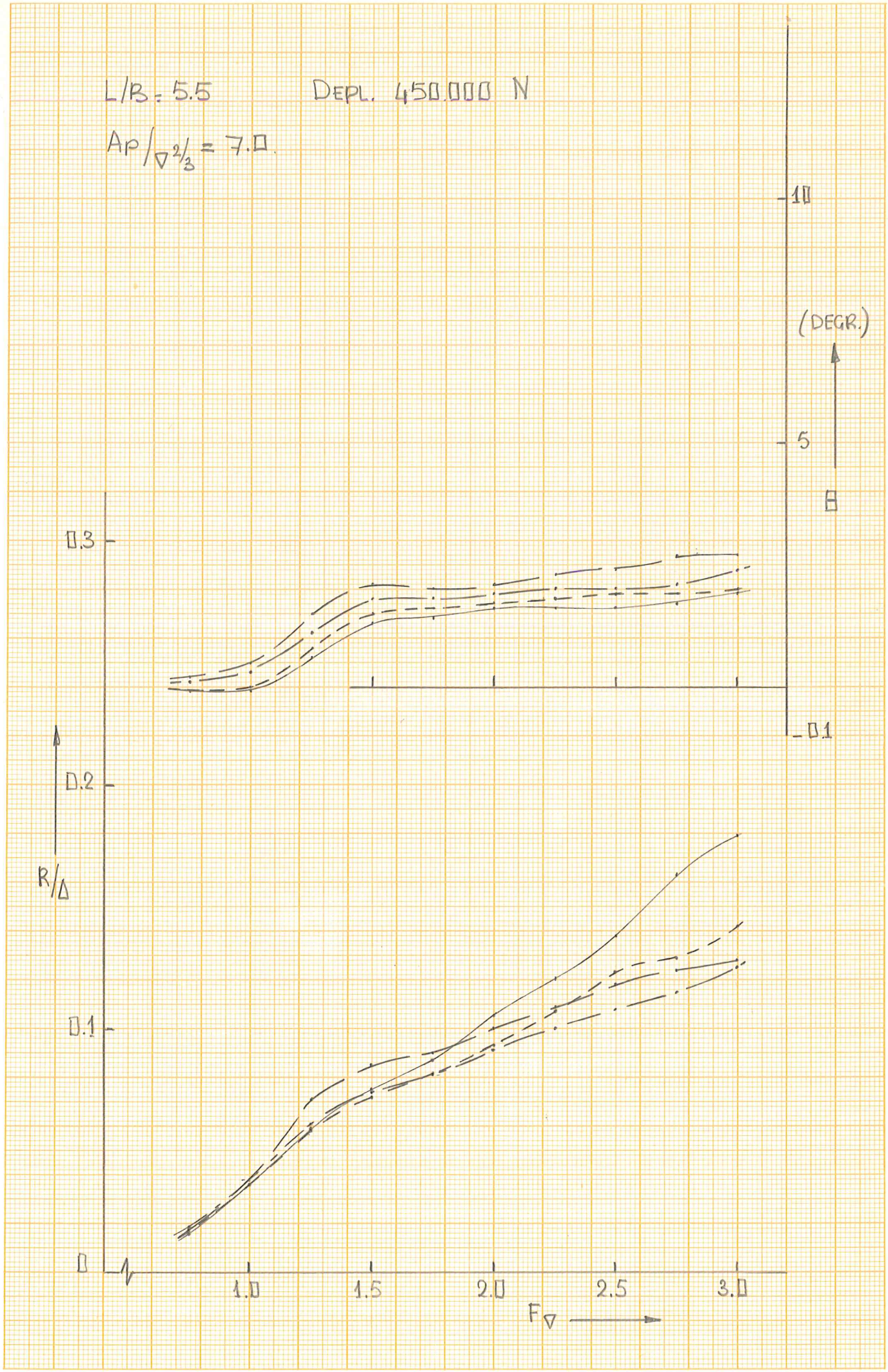


fig 16 verso - L

L/B = 5.5 DEPL: 450.000 N

$A_P/\nabla^{2/3} = 8.5$

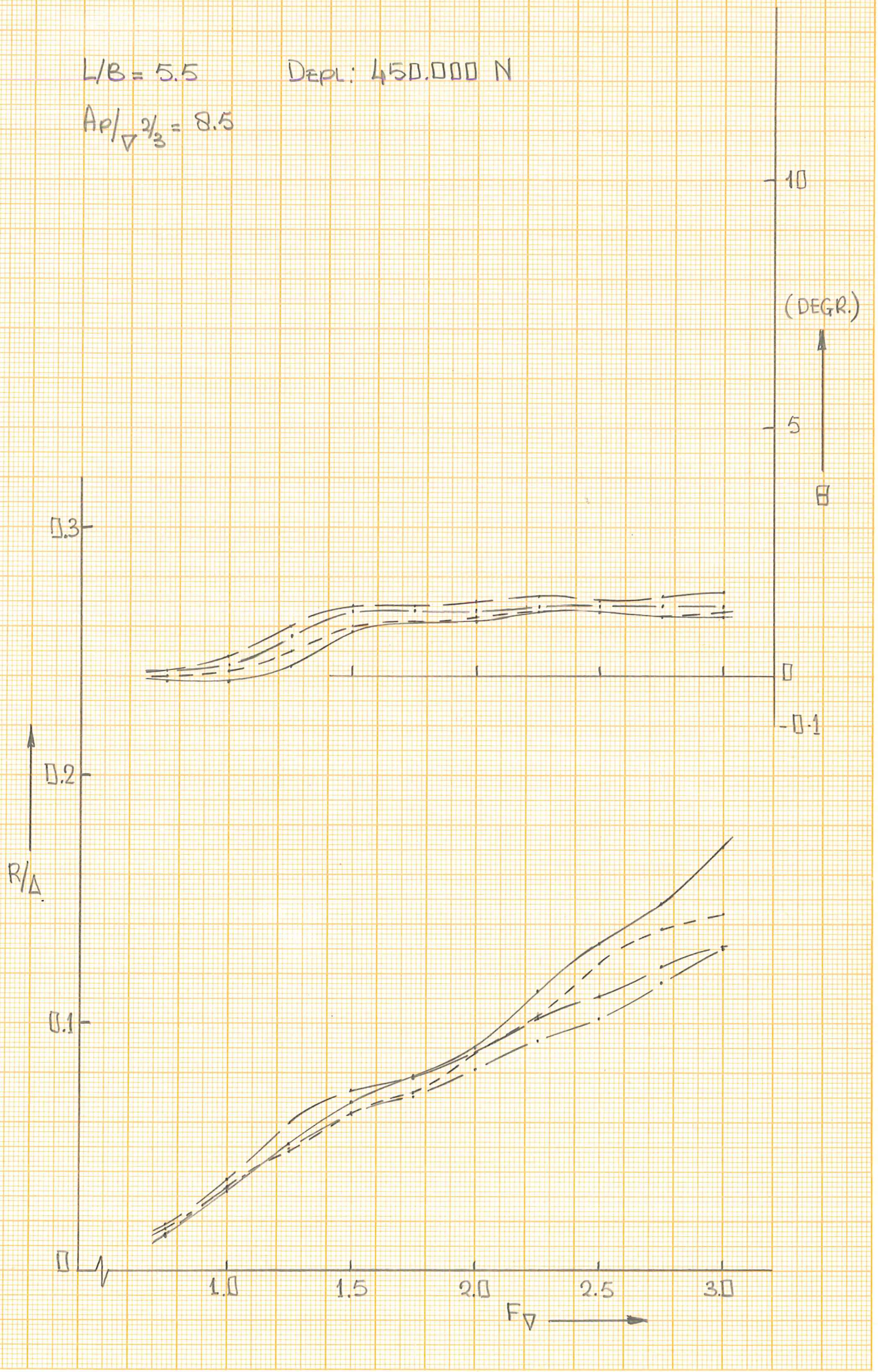


fig 16 verw. R

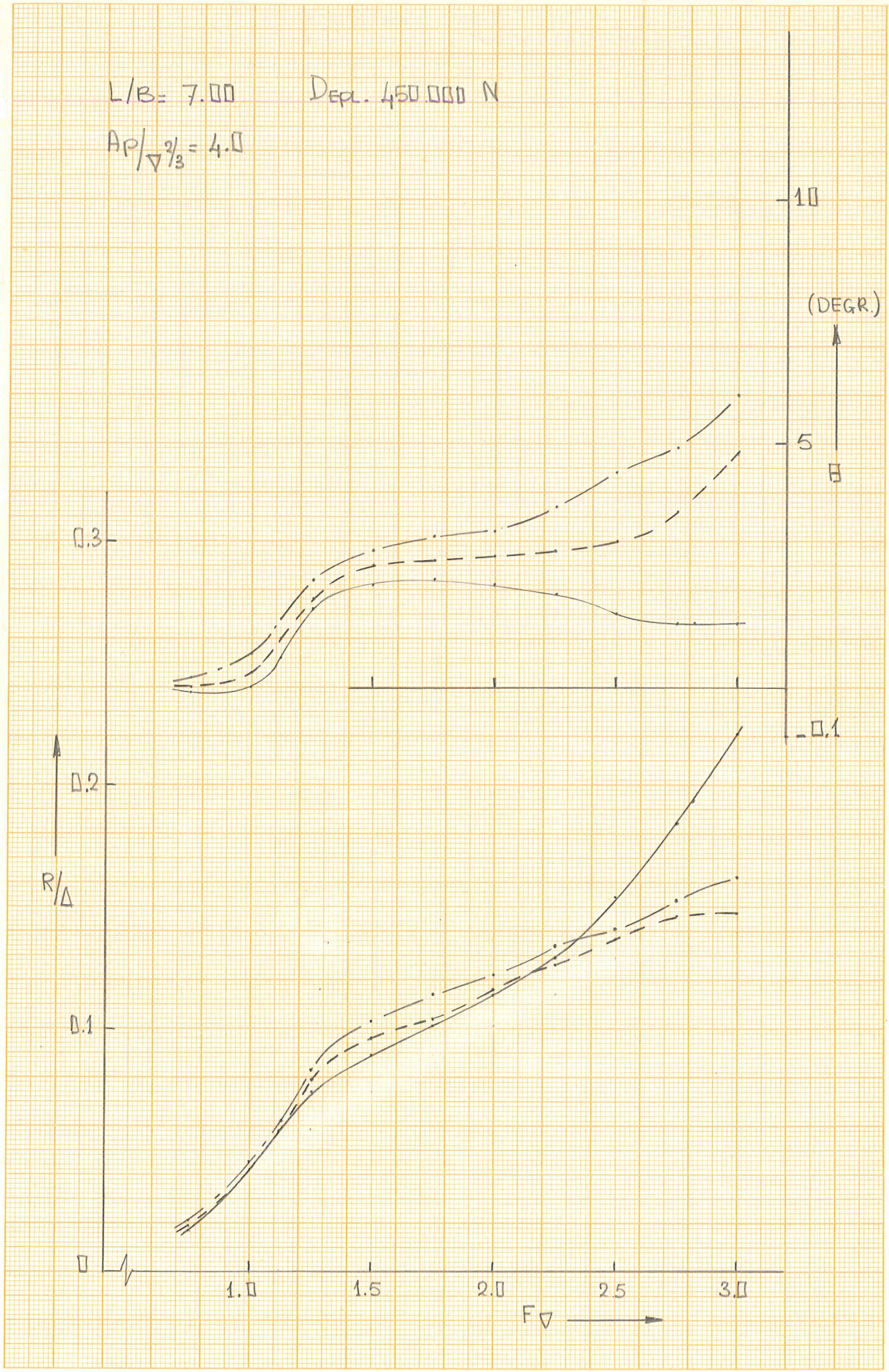

L/B= 7.00
DEPL. 450.000 N
Ap/∇2/3 = 4.0
10
(DEGR.)
5
B
0.3
0.2
R/Δ
0.1
0
0.1
1.0
1.5
2.0
2.5
3.0
F∇

fig 17 L.

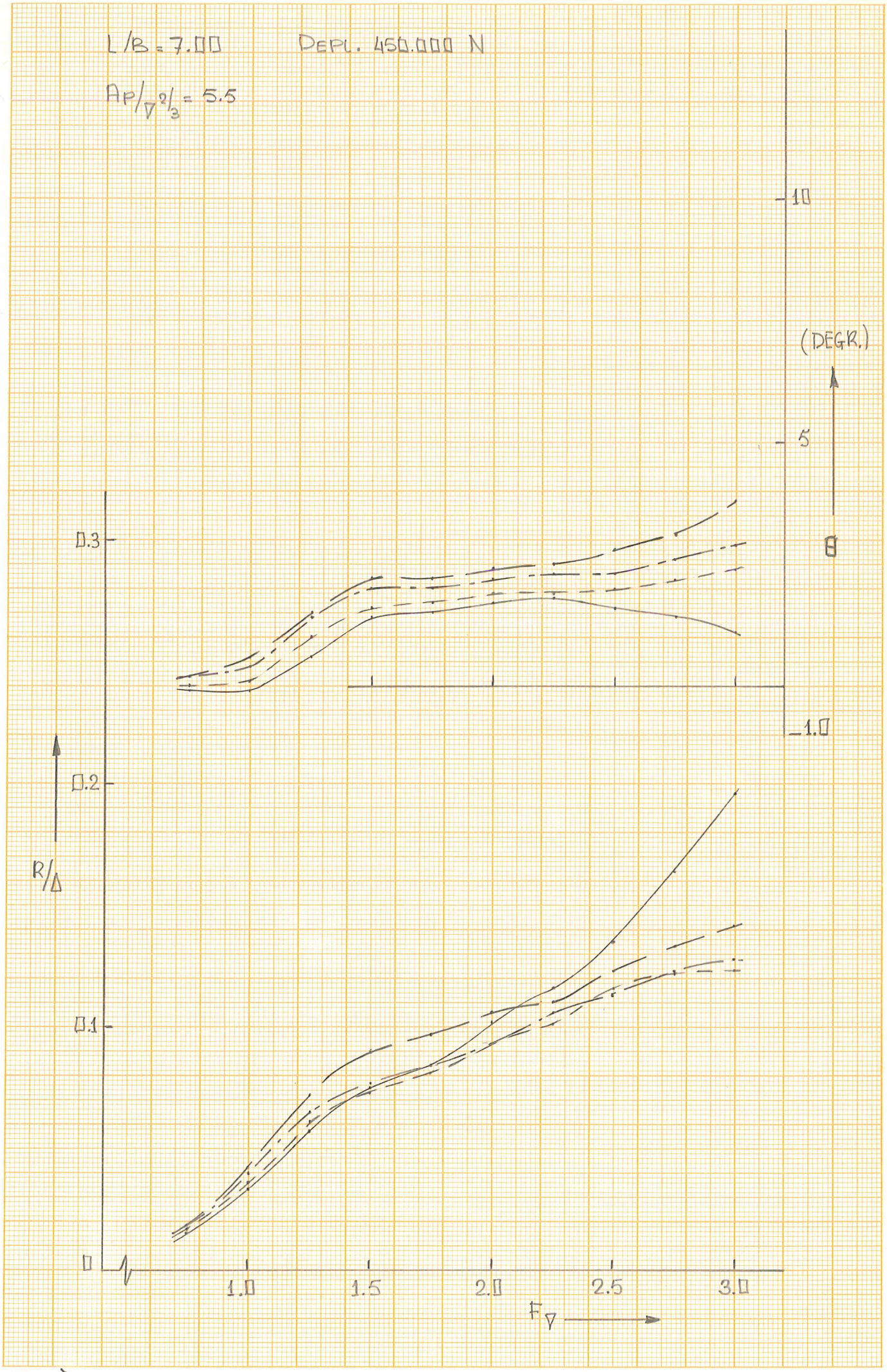

L/B = 7.00
DEPL. 450.000 N
$A_P/\nabla^{2/3}$ = 5.5
10
(DEGR.)
5
θ
0.3
0.2
R/Δ
0.1
0
1.0
1.5
2.0
2.5
3.0
F_∇
1.0

fig 17 R.

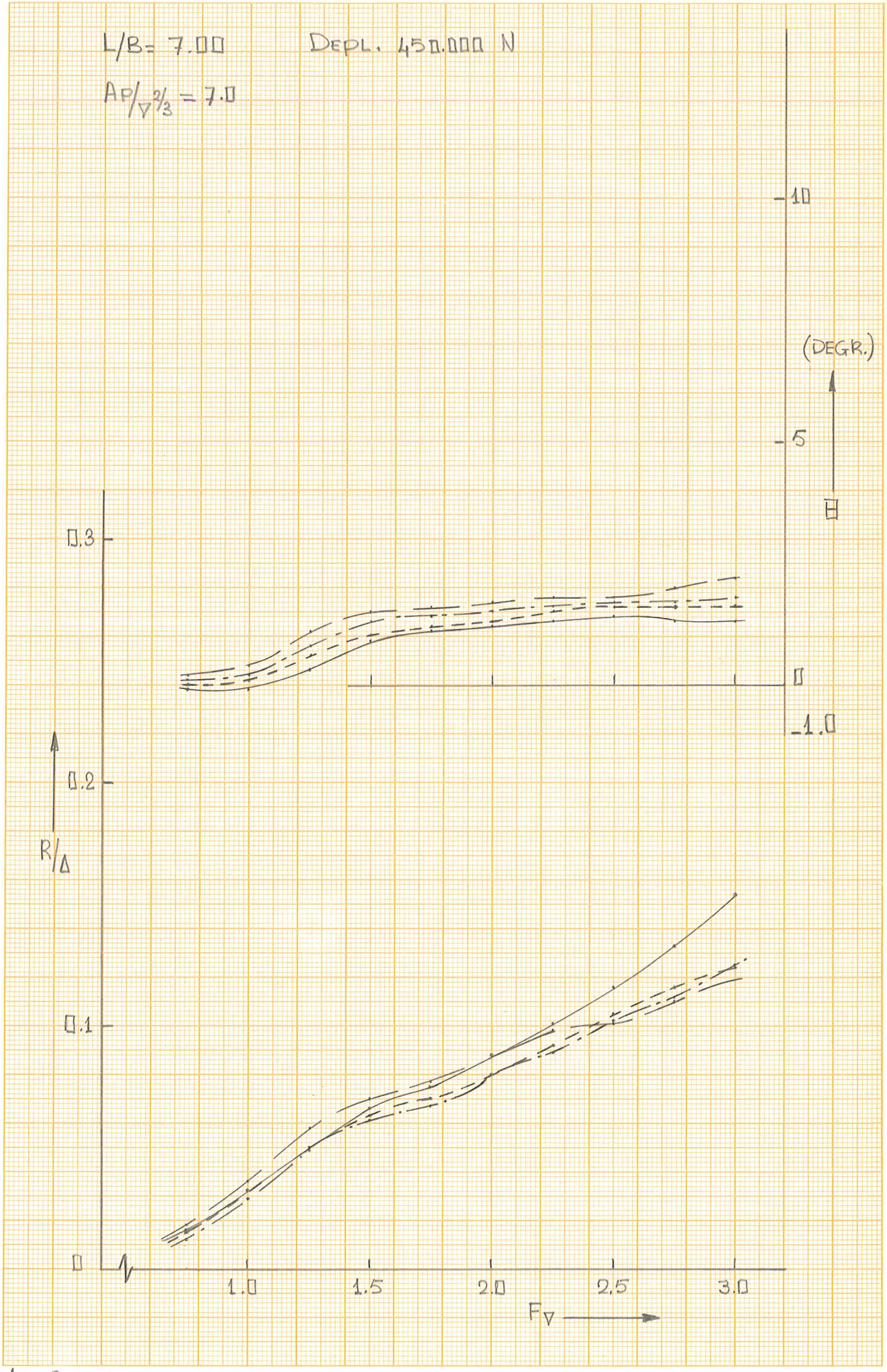

L/B = 7.00
DEPL. 450.000 N
Ap/∇2/3 = 7.0
10
(DEGR.)
5
H
0.3
0.2
R/Δ
0.1
0
0
-1.0
1.0
1.5
2.0
2.5
3.0
Fv

fig 17 VERN. L.

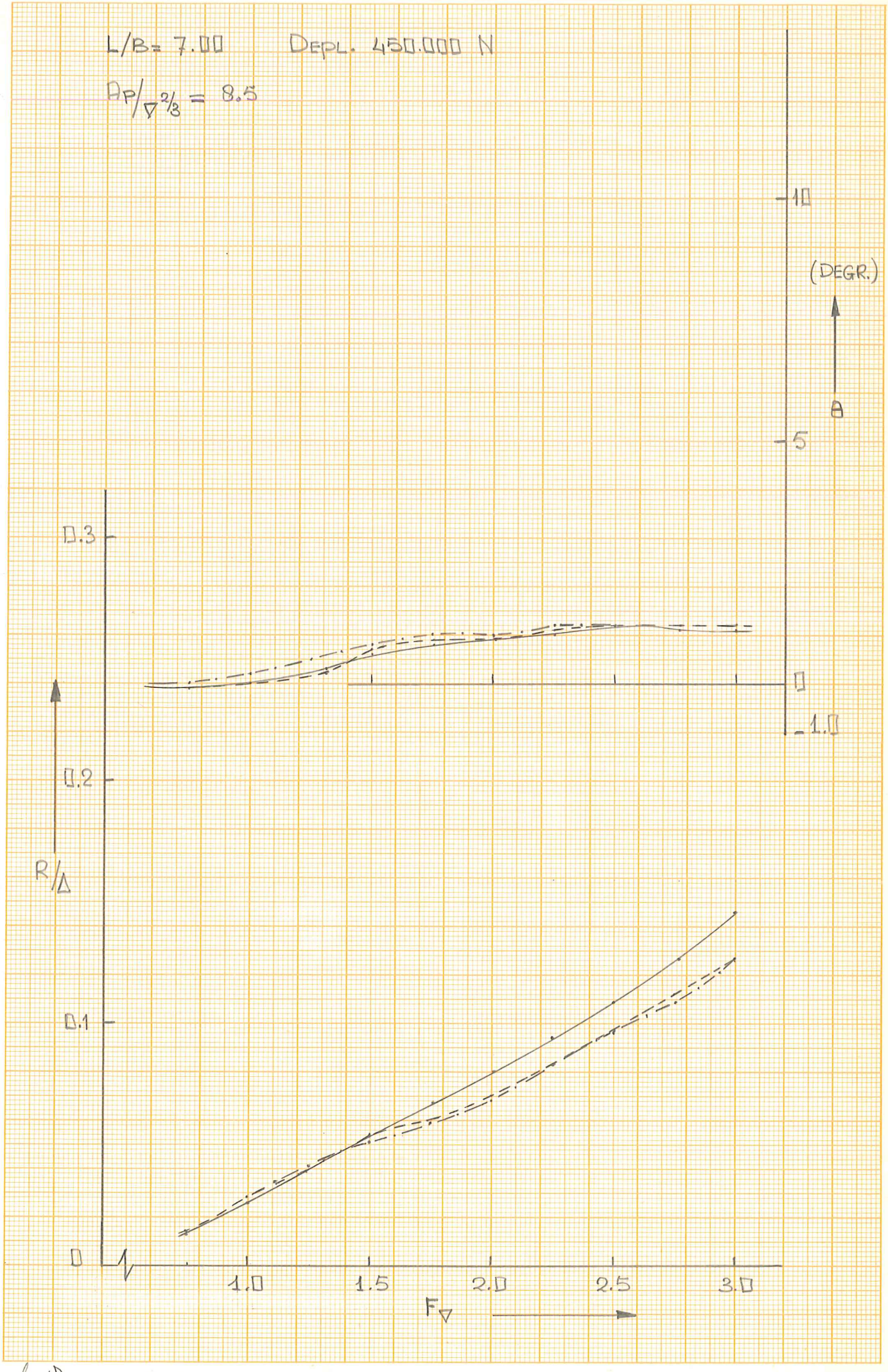

L/B= 7.00
DEPL. 450.000 N
$D_P/\nabla^{2/3}$ = 8.5
10
(DEGR.)
θ
5
0.3
0.2
0.1
0
-1.0
R/Δ
1.0
1.5
2.0
2.5
3.0
F_∇

fig 17 vers R.

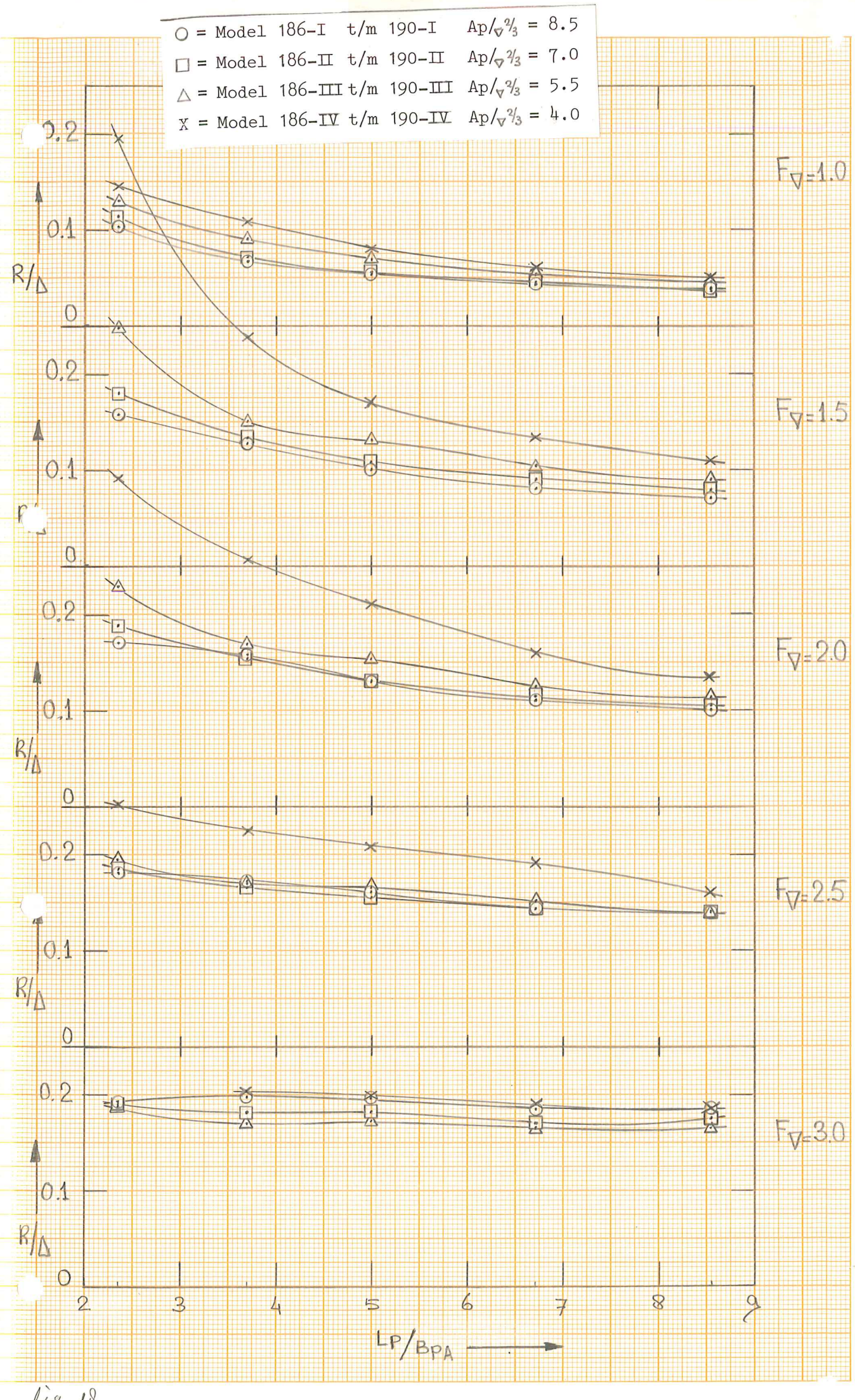

○ = Model 186-I t/m 190-I Ap/∇^2/3 = 8.5
□ = Model 186-II t/m 190-II Ap/∇^2/3 = 7.0
△ = Model 186-III t/m 190-III Ap/∇^2/3 = 5.5
X = Model 186-IV t/m 190-IV Ap/∇^2/3 = 4.0
F∇=1.0
F∇=1.5
F∇=2.0
F∇=2.5
F∇=3.0
R/Δ
0.2
0.1
0
2
3
4
5
6
7
8
9
LP/BPA

fig. 18.

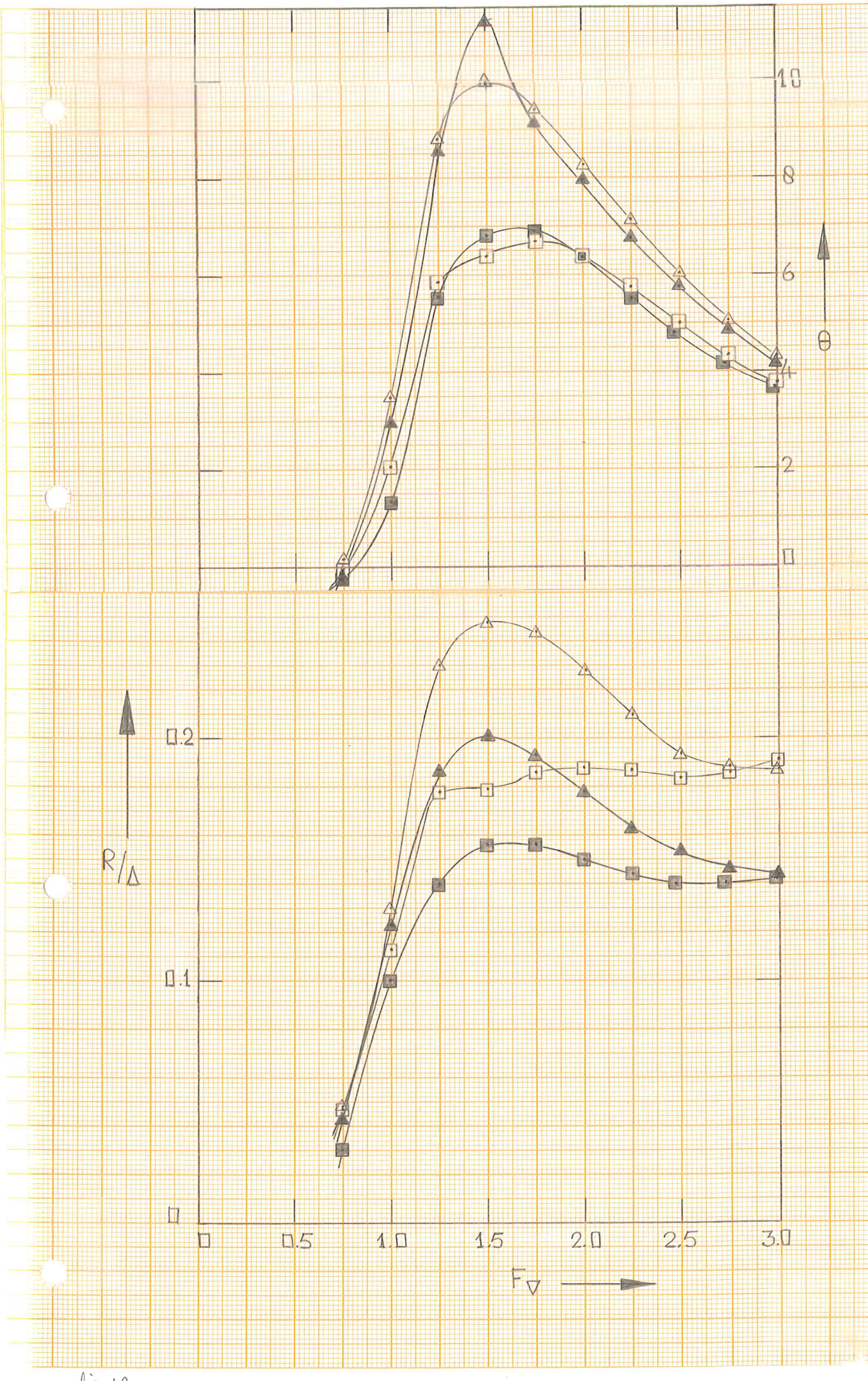


Fig 19

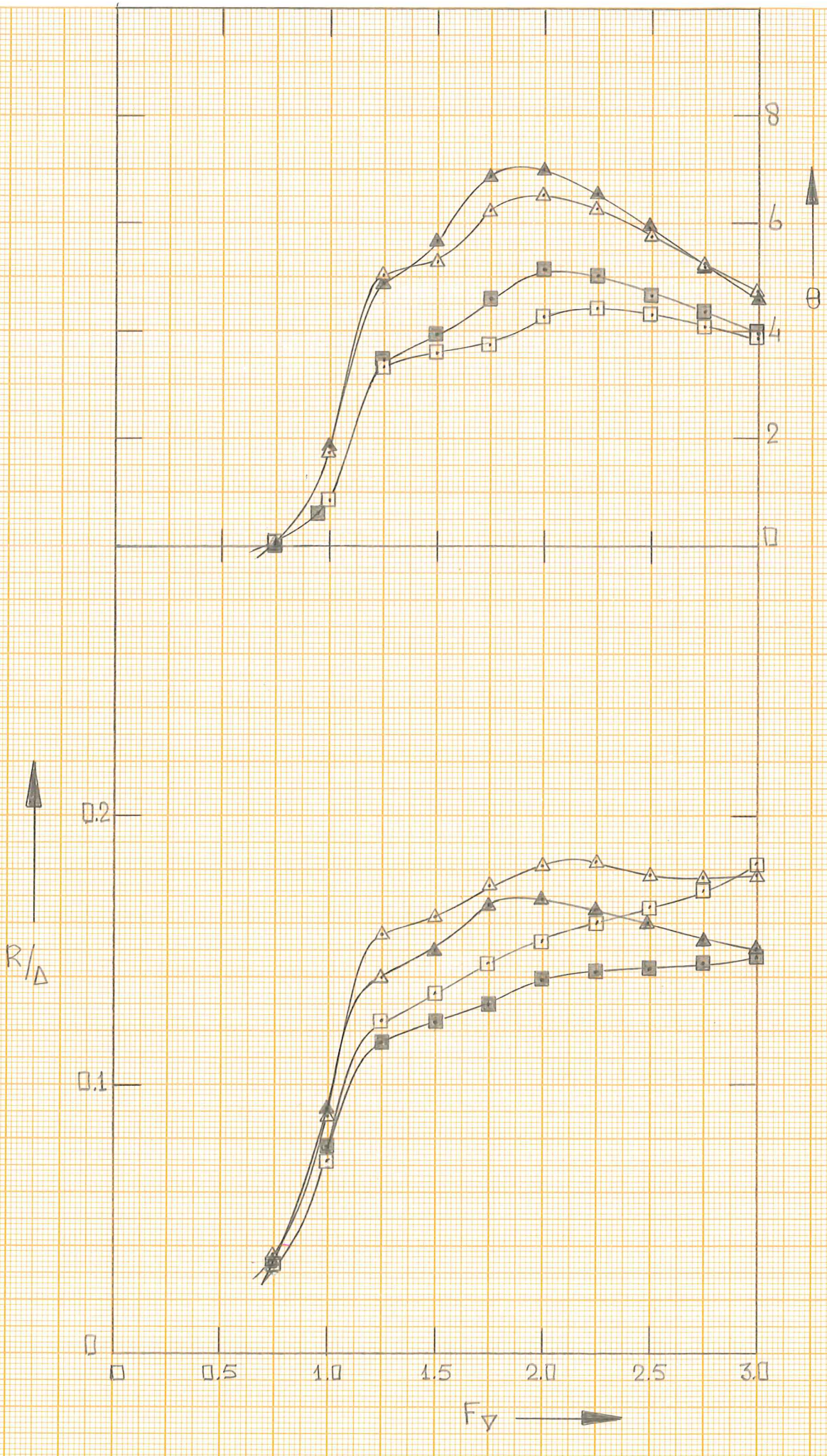


fig 20

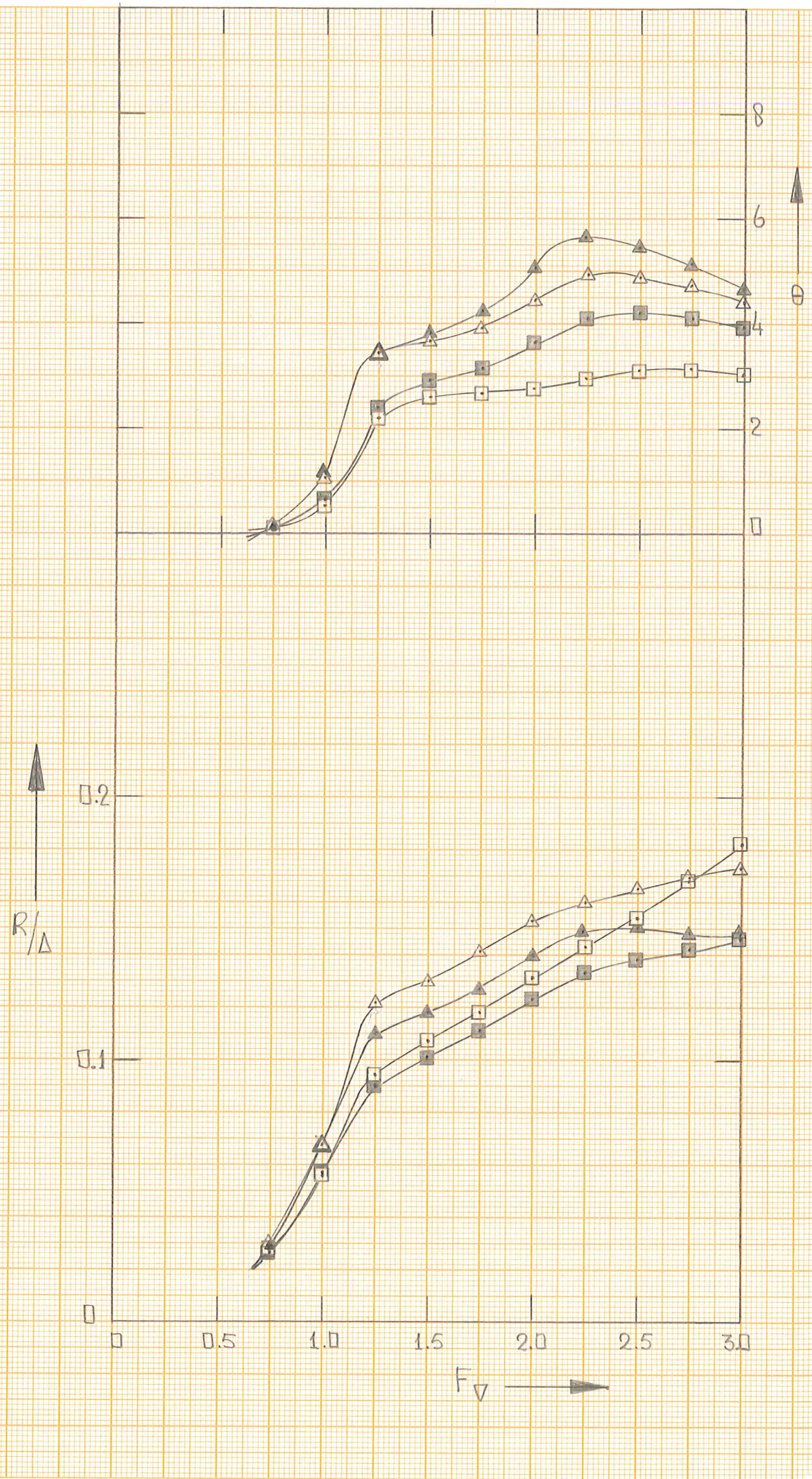
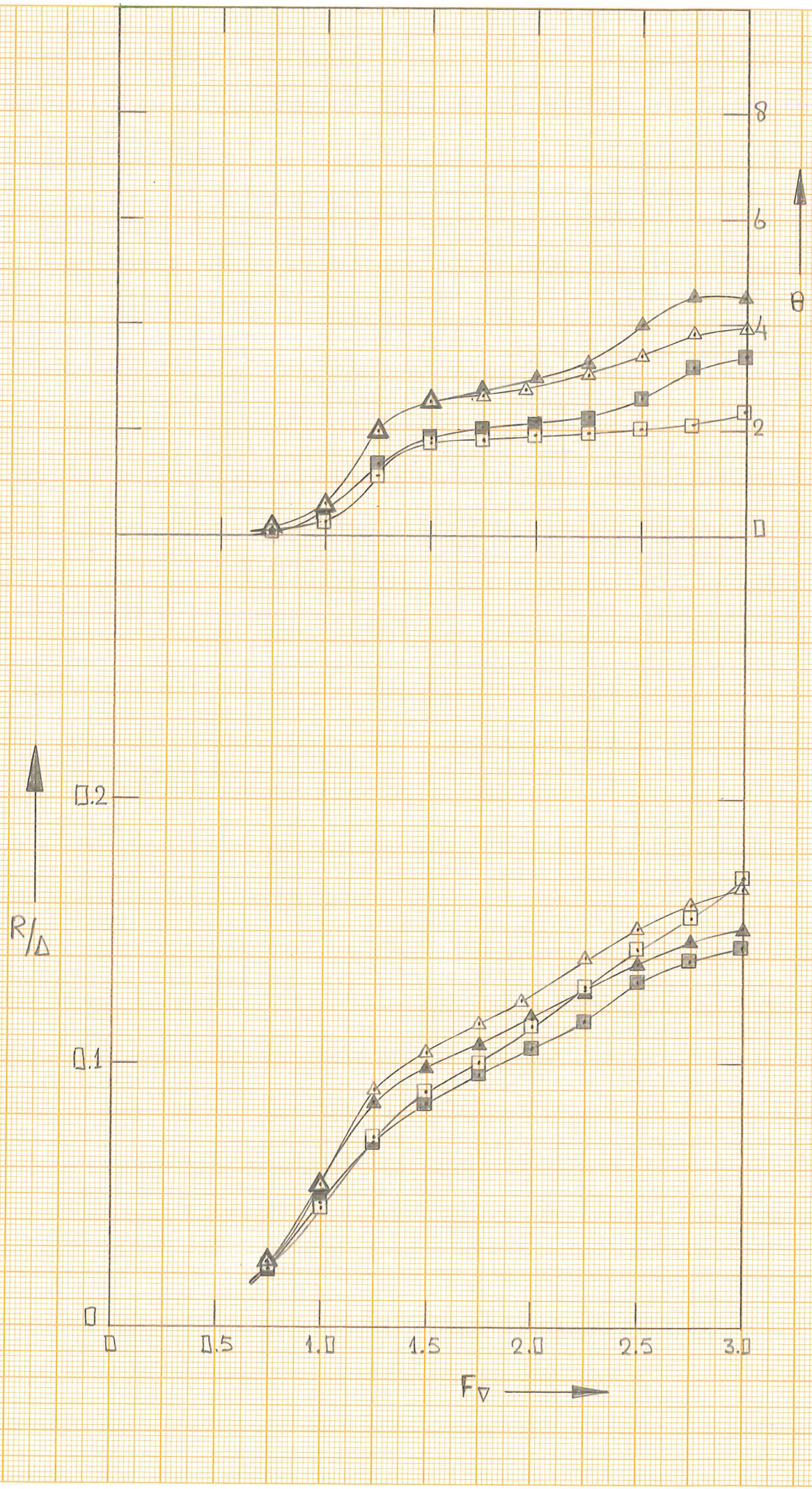


fig 21


8
6
θ
4
2
0
0.2
R/Δ
0.1
0
0
0.5
1.0
1.5
2.0
2.5
3.0
F∇

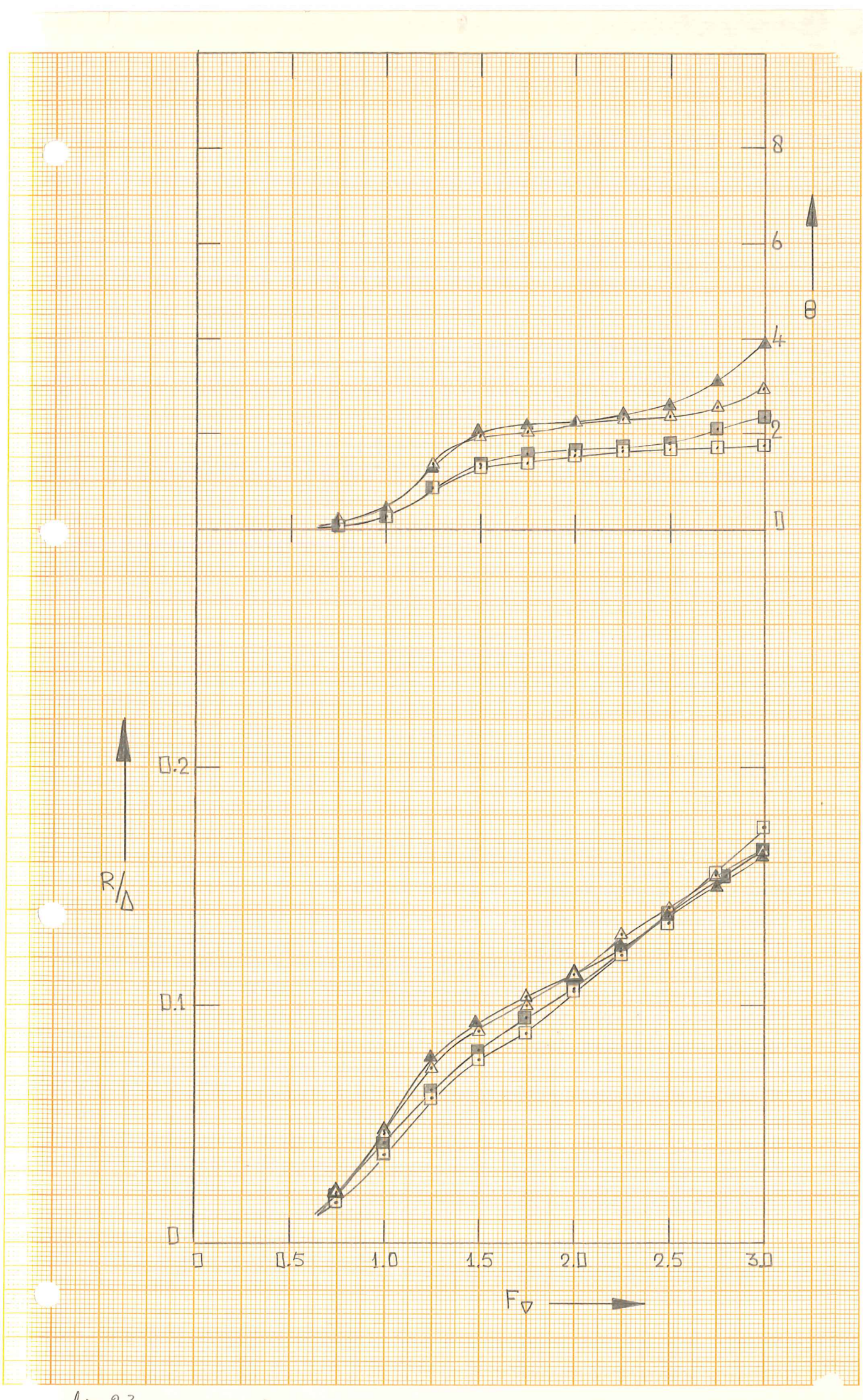


fig 23