Propositions

accompanying the dissertation

Data-Driven Identification of Lax-Integrable Partial Differential Equations

Using the Nonlinear Fourier Transform and Conversed Quantities

by

Pascal Bastiaan Johannes DE KOSTER

1. The spectral parameter λ defined by AKNS (Ablowitz, Kaup, Newell, Segur) in the forward scattering transform should be redefined as $\lambda_{(\text{new})} = -\lambda/2$, as this provides more intuitive relations with the linear Fourier transform. *(This proposition pertains to this dissertation.)*
2. The discrete spectrum of AKNS-type partial differential equations is continuous in the waveform, except for bifurcations from the real axis. *(This proposition pertains to this dissertation. Chapter 3.)*
3. The sine-Gordon equation and focusing modified Korteweg-de Vries possess the same spectral Lax operator, and are therefore closely related. *(This proposition pertains to this dissertation. Chapter 6)*
4. The trajectory of solitons during collisions can be described in two ways: mathematically, solitons “tunnel through” each other; physically, solitons “bounce” as pool balls and swap energy. *(This proposition pertains to this dissertation. Chapter 5.)*
5. If artificial intelligence can perform a task better than a human, education should no longer prioritize teaching that task to humans.
6. Although many cities worldwide are bicycle unfriendly, cycling is often still the most efficient means of transportation.
7. Wearing helmets for cycling less than 25 km/h should not be encouraged.
8. Nuance should be more used in debates. A good start would to be avoid using the words ’never’ and ’always’.
9. Universities should avoid promoting expensive software to students when similarly good open-source alternatives are available.
10. If humans had had only eight fingers, eight propositions would have sufficed.

These propositions are regarded as opposable and defendable, and have been approved as such by the promotors Prof. Dr.-Ing. S. Wahls and Dr. M. Kok.