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Propositions

accompanying the dissertation

Reliable and Data-Efficient Machine Learning for Tractable Multiscale Material Simulations

by

Joep STORM

1. Adaptively updating a surrogate during a simulation rests on the assumption that it cannot be trusted outside its training distribution. The case for this approach shrinks as physics-embedded extrapolation improves.
2. Graph neural networks are elegant but not simple, and simplicity is more important.
3. The foundations of surrogate-based multiscale simulation are sound. The problems worth solving next will surface through application in industry, not within academia alone.
4. Thermodynamic consistency in surrogate models can be beneficial, but is neither sufficient nor necessary, and can give a false sense of assurance.
5. The time spent accelerating code is proportional to the researcher's unwillingness to wait for it.
6. A conference should be judged by the collaborations it starts, not the talks it hosts, and by that measure most conferences fall short.
7. Implementing promising methods in in-house software, rather than maintaining them in an open-source library, is faster in the short term but wastes time overall.
8. Attention is our most important resource, and guarding it is increasingly necessary. In some sense, Attention Is All We Have.
9. If progress in general-purpose AI sustains its current rate, it will likely supersede human-led research within ten years. Society is dangerously unprepared for this scenario.

This proposition pertains to the dissertation.

These propositions are regarded as opposable and defendable, and have been approved as such by the promotor dr. ir. F. P. van der Meer and co-promotor dr. I. B. C. M. Rocha.