First steps of validated numerics in machine learning

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Machine learning has been taking the world by storm over the last couple of years, but many technical questions remain unanswered.
In this talk, we present an interpretation of AI as a dynamical system. This rewriting allows us to exploit classical techniques to extract information from the trained AI system [1]. Coupling this with a validated approach then permits us to determine dynamical behaviours of a trained algorithm.
In particular, we tackle the problem of appearance of periodic orbits w.r.t. both hyperparameters and trained parameters. Then, we consider the problem of robustness in the output of a trained AI model, and present a framework to express the stability of a given output w.r.t. to the input. The validated numerics techniques are applied after the training process thus providing us with significant flexibility.

[1] E. Queirolo, C. Kuehn. *Computer validation of neural network dynamics : A first case study.* Available at SSRN 4547794.

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