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Title: Prescribed Exponential Stabilization of a One-Layer Neural Network with Delayed Feedback

Abstract: We provide a control-oriented delay-based modeling of a one-layer neural network of Hopfield type, subject to an external input designed as delayed feedback. This modeling exploits a recently established partial pole placement method for linear functional differential equations, which relies on the coexistence of real spectral values and allows for explicit prescription of the exponential decay of the closed-loop solution. The proposed framework improves some pioneering and scarce results from the literature on the characterization of the exact solution's exponential decay when a simple real spectral value exists. In particular, we provide insights into the design of a one-layer neural network that can be exponentially stabilized through delayed feedback with a prescribed decay rate, regardless of whether the inherent neuron dynamics are stable or unstable.