

Parameter extraction with reservoir computing: Nonlinear time series analysis and application to industrial maintenance

Journal Article

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Relevance to the Centre

We study the task of determining parameters of dynamical systems from their time series using variations of reservoir computing. Averages of reservoir activations yield a static set of random features that allows us to separate different parameter values. We study such random feature models in the time and frequency domain. For the Lorenz and Rössler systems throughout stable and chaotic regimes, we achieve accurate and robust parameter extraction. For vibration data of centrifugal pumps, we find a significant ability to recover the operating regime. While the time domain models achieve higher performance for the numerical systems, the frequency domain models are superior in the application context.

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