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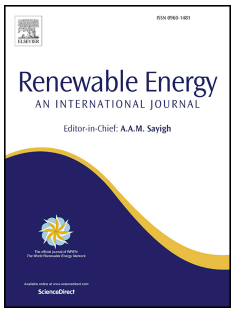

Wind Speed and Wind Direction Forecasting Using Echo State Network with Nonlinear Functions

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Highlights

This paper introduces two novel echo state networks called NESN-P and NESN-MP with the following characteristics:

- A reservoir including linear internal states and readout containing units using nonlinear functions of the internal states.
- High learning capability and forecasting accuracy without significant deterioration with time.
- Fewer internal states and lower order weight matrices relative to ESN, which reduces the computational load considerably.
- A simple design, far less computation, and do not require extensive training, parameter tuning, or complex optimization.
- Significantly lower error values than those of ANFIS and ESN for different wind profiles.

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