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## A Survey and some new results on machine learning methods for the estimation of the power curve of wind turbines

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In this work, we provide a comprehensive survey of recent machine learning approaches for wind turbine power curve (WTPC) estimation. Additionally, we revisit the classical polynomial model aiming at improving it by means of an automatic and more parsimonious design. For this purpose, we propose a methodology based on evolutionary computation which returns the optimal order of the polynomial as well as selects (by pruning) the relevant terms in this polynomial. A comprehensive performance comparison is carried out involving the proposed approach and the state of the art in estimating the power curve of wind turbines, such as the logistic models (with 4 and 5 parameters), artificial neural networks, Takagi-Sugeno fuzzy model, and weighted polynomial regression. The results clearly indicate that the proposed methodology consistently outperforms the state of the art methods.

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