عنوان مقاله:

A Data-Based Policy Model for Intelligent Turbine Cascade Design

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خلاصه مقاله:

The study of intelligent design methods is becoming a hot topic for the design of turbine cascades. This paper proposes a data-based policy model to achieve intelligent design. To gain a high-quality policy model, empirical equations and "space extending + elitism" are adopted to dynamically optimize database. This guarantees the quality of the model. Compared to traditional optimization design approaches, the proposed method relies on less human experience to design a turbine cascade. Ten different turbine cascades are used to verify this method. Results show that, aerodynamic performance of the cascades redesigned is either the same as or better than that of the traditional cascades. The computing time is reduced by more than one order of magnitude compared to a "CFD + optimization algorithm" or "surrogate model + optimization algorithm" method. With the advantages in computing time and intelligence, the proposed novel method shows the possibility of replacing traditional design methods.

کلمات کلیدی:

Cascade design, Surrogate model, Artificial intelligence, Optimization design, Neural network