Optimization of coaxial double rotor blades

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Abstract:

This paper develops a novel optimization model for coaxial double-rotor blades. The optimization considers both rotors with the same diameter. Once it is based on the blade element momentum theory (BEMT), the method has low computational cost and easy implementation. It is developed by utilizing the Bernoulli principle along the streamlines that pass surrounding the blades of both rotors and the conservation laws for mass and momentum. This optimization method calculates chord and twist angle distributions of the blades for the two coaxial rotors. The aerodynamic geometries of the blades are dependent on the inflow and pressure between rotors. The total torque of double rotor is increased when compared to a single rotor turbine. This result is useful for turbine starting, contributing to improve power generator of turbines operating at very low velocity.

References:

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