

Augmentation of the actuator-disk method for low-pressure axial flow fan simulation

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Low-pressure axial flow fans find application in many industrial systems (e.g. air-cooled condensers and carbon capture systems). Accurate numerical simulation of these fans in the context of large-scale installations, is important for the development and improvement of those systems. Using insights derived from high-fidelity computational fluid dynamic analyses, a new actuator-disk fan model formulation was developed based on the unique aerodynamic behaviour of axial fans. The new formulation exceeds the capacity of existing models to accurately estimate real fan blade forces and it offers an improved field flow resolution, enabling researchers to better investigate complex system dynamics.