

AN ACTUATOR DISC LEVEL SET MODEL FOR WIND FARM MESH GENERATION AND ADAPTATION

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ABSTRACT

We present a level set approach to discretize the actuator disc model of the turbines of a wind farm. We represent the actuator disc geometry using a level set function that describes the actuator disc boundary. Instead of treating the disc as a geometry at the preprocessing step, we use an adaptive process to discretize the level set actuator disc representation. One of the advantages of the level set approach is that it can be coupled with standard solution driven adaptation to simultaneously adapt the mesh to both the geometry and the solution. In addition, the flexibility of the level set representation allows modifying the geometric configuration according to the actual flow, enabling the reorientation of the turbines during the simulation. We present several results to validate and illustrate the advantages of the proposed approach.

Keywords: level set, mesh adaptation, wind farms, actuator disc