

CFD simulation data based surrogate model approach and its application

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Computational fluid dynamics (CFD) models have a massive number of energy, mass and momentum balance equations in general. In addition, there are several operating and boundary conditions for reflecting the real process. These facts bring the complexity of simulations and lots of computational burdens. Data-driven surrogate modeling methods such as deep neural network techniques (DNN) are applied to construct a surrogate model in order to solve this computational problem. The data for machine learning are CFD simulation results of an open rack vaporizer (ORV). The data-driven model has a more straightforward and explicit formulation, and as a result, its computational loads decrease compared to the original CFD model. The advantages and limitations of the proposed surrogate model based method are discussed in this presentation.