Active learning methodologies for surrogate model development in CFD applications[1] INDRANIL PAN, GABRIEL GONCALVES, ASSEN BATCHVAROV, YUXIN LIU, YUYI LIU, VIKNESWARAN SATHASIVAM, NICHOLAS YIAKOUMI, Imperial College London, LACHLAN MASON, Alan Turing Institute, OMAR MATAR, Imperial College London — Computational fluid dynamic simulations typically have high computational costs, such that for parametric analysis and engineering design an inexpensive surrogate model, which is capable of reproducing the trends of some variables of interest, may be desired. However, generating regressions based on a full grid-based parametric variation is generally infeasible even for a system with moderate number of parameters. In this work, a wide array of active learning techniques were coupled with different regression models to achieve high predictive performance under the constraints of a limited function evaluation budget. The case studies involve flows of industrial relevance and the results outline some best practices for such simulations and highlights future research directions.

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