Abstract Submitted
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Zonal Turbulence Modeling via Decision Trees..[1] RACHEET MATAI, Geminus.AI, PAUL DURBIN, Iowa State University — The idea of a zonal model is a given model, but with its coefficients varying in different regions of a flow. That idea suggests using a form ofclassifier to identify zones. The bag-of-trees algorithm has been used to devise a zonal k-omega model. The training data are optimized, coefficient discrepancy fields, obtained by the method of Duraisamy, et al, 2015.The optimization is done with LES data as the target for flow over a circular arc bump. The discrepancy data are binned, with each bin assigned a particular range of values. The zones are parameterized by training the machine learning model with a local feature set. The features are coordinate invariant flow parameters. The classification that is derived by ML is close toassociating zones with adverse and favorable pressure gradients. The correction produced by the machine learning algorithm is self-consistent; i.e. once the solution converges, the zones remain fixed.

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