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Mesh quality metrics for large-eddy simulation of fire dynamics
RANDALL MCDERMOTT, NIST — The Fire Dynamics Simulator (FDS) is a large-eddy simulation code used in fire safety engineering. In this talk, we outline the implementation of three mesh quality metrics in FDS: (1) a measure of turbulence resolution based on a model for the fraction of unresolved kinetic energy (Pope, 2004), (2) a measure of scalar resolution based on a model for the unresolved scalar variance (Vervisch et al., 2010), and (3) a simple wavelet-based error measure. The metrics are examined in grid resolution studies of the McCaffrey fire plume experiments (McCaffrey, 1979), establishing target metric values for fire plume applications.

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