



Block-Coupled Solution of Species and Energy Transport for Reacting Flows

Henrik Rusche¹, Hrvoje Jasak², Bastian Werdelmann³, Michael Huth³

¹ Wikki GmbH, Wernigerode, Germany

² Wikki Ltd., London, United Kingdom

³ Siemens AG

Detailed chemistry in FOAM can take up a substantial amount of time in the solution process. A potential avenue to accelerate the time to solution is to solve the species and energy equations together in a block-coupled manner. The work follows the spirit of the work of Di Domenico, while the required sensitivities (Jacobian) of the chemical sources terms are obtained by numerical differentiation. The block-coupled species and energy transport has then been implemented into two solvers: a laminar flame solver and an artificially thickened flame solvers. The solvers have been validated for 1D test cases as well as a complex 3D validation case.

This presentation covers an outline of the implementation, validation results as well as performance comparisons for different time steps.

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