Comparison of Three Base Flow Representations for Modeling the Optically Heated Floating-Zone with the Full-Zone HAN LI, BRENT HOUCHENS, Department of Mechanical Engineering and Materials Science, Rice Univeristy — Three different base flow representations have been studied for the full-zone model of the optically heated floating-zone crystal growth process. The basic difference among the models is the variable groups that are used, and the resulting orders of differentiation in the governing equations. The models include: 1) a stream function-temperature representation, with 4th order derivatives in the biharmonic type governing momentum equation, 2) a vorticity transport-temperature representation, and 3) a primitive variable formulation. The last two involve 2nd order derivatives in the governing equations, as is typical. These three representations are presented and comparisons of computational performance and simulation precision are discussed.

Han Li
Dept. of Mechanical Engineering and Materials Science, Rice Univeristy

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