MODELING IC ENGINE CONJUGATE HEAT TRANSFER
USING THE KIVA CODE

Egel Urip, Ka Heng Liew, and S. L. Yang

Department of Mechanical Engineering—Engineering Mechanics, Michigan
Technological University, Houghton, Michigan 49931, USA

Locating hotspots in metal engine components can be used as an impetus to design a better cooling system. This study focuses on a numerical investigation of a three-dimensional (3-D) transient heat transfer process for a Ford 5.4-L V8 engine. A 3-D transient finite volume method to solve the heat conduction equation is presented first. This is followed by the implementation of the coupling equations at the gas–solid interface into the KIVA code. The numerical model is validated by a one-dimensional heat conduction problem. Finally, 3-D simulation of the Ford engine with conjugate heat transfer mode is presented and discussed.