



A Three-Dimensional Parallel Time-Accurate Turbopump Simulation Procedure Using Overset Grid System

By Cetin Kiris

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 42 pages. Dimensions: 9.7in. x 7.4in. x 0.1in. The objective of the current effort is to provide a computational framework for design and analysis of the entire fuel supply system of a liquid rocket engine, including high-fidelity unsteady turbopump flow analysis. This capability is needed to support the design of pump sub-systems for advanced space transportation vehicles that are likely to involve liquid propulsion systems. To date, computational tools for design analysis of turbopump flows are based on relatively lower fidelity methods. An unsteady, three-dimensional viscous flow analysis tool involving stationary and rotational components for the entire turbopump assembly has not been available for real-world engineering applications. The present effort provides developers with information such as transient flow phenomena at start up, and nonuniform inflows, and will eventually impact on system vibration and structures. In the proposed paper, the progress toward the capability of complete simulation of the turbo-pump for a liquid rocket engine is reported. The Space Shuttle Main Engine (SSME) turbo-pump is used as a test case for evaluation of the hybrid MPIOpen-MP and MLP versions of the INS3D code. CAD to solution auto-scripting capability is being developed...



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