Further Improvement in 3DGRAPE

“3DGRAPE/AL-V2” denotes version 2 of the Three-Dimensional Grids About Anything by Poisson’s Equation with Upgrades from Ames and Langley computer program. The preceding version, 3DGRAPE/AL, was described in “Improved 3DGRAPE” (ARC-14069) NASA Tech Briefs, Vol. 21, No. 5 (May 1997), page 66. These programs are so named because they generate volume grids by iteratively solving Poisson’s Equation in three dimensions. The grids generated by the various versions of 3DGRAPE have been used in computational fluid dynamics (CFD). The main novel feature of 3DGRAPE/AL-V2 is the incorporation of an optional scheme in which anisotropic Lagrange-based trans-finite interpolation (ALBTFI) is coupled with exponential decay functions to compute and blend interior source terms. In the input to 3DGRAPE/AL-V2 the user can specify whether or not to invoke ALBTFI in combination with exponential-decay controls, angles, and cell size for controlling the character of grid lines. Of the known programs that solve elliptic partial differential equations for generating grids, 3DGRAPE/AL-V2 is the only code that offers a combination of speed and versatility with most options for controlling the densities and other characteristics of grids for CFD.

This program was written by Vincent Anicich, Rob Thorpe, Greg Fletcher, Hunter Waite, Julia Xu, Erin Walter, Kristie Frick, Greg Farris, Dave Gell, Jufy Furman, Butch Carruth, and John Parejko of Caltech for NASA’s Jet Propulsion Laboratory. Further information is contained in a TSP (see page 1).

This software is available for commercial licensing. Please contact Don Hart of the California Institute of Technology at (818) 393-3425. Refer to NPO-40282.

MER SPICE Interface

MER SPICE Interface is a software module for use in conjunction with the Mars Exploration Rover (MER) mission and the SPICE software system of the Navigation and Ancillary Information Facility (NAIF) at NASA’s Jet Propulsion Laboratory. (SPICE is used to acquire, record, and disseminate engineering, navigational, and other ancillary data describing circumstances under which data were acquired by spaceborne scientific instruments.) Given a Spacecraft Clock value, MER SPICE Interface extracts MER-specific data from SPICE kernels (essentially, raw data files) and calculates values for Planet Day Number, Local Solar Longitude, Local Solar Elevation, Local Solar Azimuth, and Local Solar Time (UTC). MER SPICE Interface was adapted from a subroutine, denoted m98SpiceIF written by Payam Zamani, that was intended to calculate SPICE values for the Mars Polar Lander. The main difference between MER SPICE Interface and m98SpiceIF is that MER SPICE Interface does not explicitly call CHRONOS, a time-conversion program that is part of a library of utility subprograms within SPICE. Instead, MER SPICE Interface mimics some portions of the CHRONOS code, the advantage being that it executes much faster and can efficiently be called from a pipeline of events in a parallel processing environment.

This program was written by Abhinandan Jain, Jeng Yen, Garrett Sohl, Robert Steele, and J. Balaram of Caltech for NASA’s Jet Propulsion Laboratory. Further information is contained in a TSP (see page 1).

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