The Global Gravity Gradient Field of the Planet Mars Determined using a Spherical Harmonic Expansion and the Fourier Transform: A Comparative Analysis JUAN HINOJOSA, Texas AM International University — The planetary geophysics community now has available high-resolution gravity and surface topography fields of the planet Mars due to the recent spacecraft missions to the planet. This research deals with a comparative analysis of the global gravity gradient field of the planet Mars determined using two approaches: (1) spherical harmonic expansion (the radial gravity gradient, $g_{r,r}$), and (2) Fourier transform (the vertical gravity gradient, $g_{z,z}$). While the gravity gradient has been used extensively in exploration geophysics studies (via the Fourier transform), only recently has the gravity gradient been used globally in planetary geophysics (via spherical harmonic expansions). Since a spherical harmonic expansion calculation is very computationally intensive, unlike a Fourier transform calculation, the goal of this research is to investigate the accuracy in terms of the RMS error of the global gravity gradient obtained using the Fourier transform compared to that obtained using a spherical harmonic expansion.

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