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The polyhedral homotopy continuation method and its applications to celestial mechanics

While the classical linear homotopy continuation method was developed for solving polynomial systems in the 1980s, the polyhedral homotopies are established in 1995, which yields a drastic improvement over the classical linear homotopies. HOM4PS-2.0 is a software package which implements the polyhedral homotopy continuation method for solving polynomial systems. With several sophisticatedly designed algorithms in mixed cell computation and curve tracing, it surpasses the existing packages in finding isolated zeros of polynomial systems, such as PHCpack, PHoM, and Bertini, in speed by big margins. With the marvelous efficiency of HOM4PS-2.0, it is now possible to solve some very large systems. Its applications to celestial mechanics will be presented in this talk.