CONTROL ID: 2567725

TITLE: Uncertainty maps for asteroid shape and pole solutions

ABSTRACT BODY:

Abstract (2,250 Maximum Characters): SAGE (Shaping Asteroids with Genetic Evolution) inversion method is based on genetic algorithm to obtain pole solutions, rotation periods and non-convex shapes of asteroids (Bartczak et.al, 2014). During the process computer graphics methods are used to compare model's synthetic lightcurves to photometric observations. The method is suitable for modelling both single and binary objects. A modelling run starts with a sphere, with no assumptions about the shape, and subsequently it converges to a stable spin and shape solution. Center of mas and moment of inertia are calculated for each model.

Modelling of an asteroid consists of multiple runs of the process, each of them following different path towards a stable solution. As a result we obtain a family of solutions. If enough data is provided, solutions are consistent with each other and can be used for error estimation.

We choose only the best models from a family of solutions, meaning every model that fits 5% threshold above best $\chi 2$ found. By comparing them we are able to construct a map of uncertainties for the shape, showing areas in good and poor agreement with chosen models. Such map can then be represented with a 3D visualisation. Moreover, we create a map of errors for pole solutions and periods.

CURRENT * CATEGORY: Asteroid Physical Characteristics: Spin States

CURRENT : None

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