Orbital Parameter estimation of multi-planet systems with Transit Time Variation

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Abstract

Transit Time Variation (TTV) may arise by the gravitational perturbation of the transiting planet by another or (still unknown) planet(s) inside or outside the orbit of the known transiting planet. Gravitational interactions perturb the velocity of the planet in its orbit which results in the perturbation of the orbital revolution period. Measurements of the transit times and the identification of differences from a mean transit period may then indicate the presence of another (still unknown) planet. The estimation of the orbital parameters of the undetected planet(s) is, however, constrained by the amplitude of the TTV. Simulations of multi-planet systems which show TTV shall be presented. The resulting TTV amplitude is analyzed with regard to the main dependencies: mass of the perturbing planet and the orbit eccentricities.

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