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Title: TRADES: a new code for the orbital fit of TTV multiple planetary systems
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Abstract: TRADES, which stands for TRAnsits and Dynamics of Exoplanetary Systems, is a Fortran90 code we have developed to study the dynamics of an exoplanetary system by fitting Radial Velocities (RVs) and Transit times (T_0) simultaneously. TRADES can be run in three modes: 1) a Levenberg-Marquardt (LM) algorithm to determine the orbital parameters by minimizing the Chi^2; 2) a grid search on data-cube by varying Period (P), eccentricity (e), and argument of the pericenter (w) of one of the planets; 3) a genetic algorithm searching for the global minimum of the Chi^2 in the parameter space. We have implemented computational parallelization with openMP to speed up the calculation. We have successfully validated TRADES on the Kepler-11 system obtaining orbital parameters and masses for the six planets which are in agreement with the literature. TRADES is still in active development. The possibility to fit for the duration of the transits and the implementation of a Monte Carlo Markov Chain (MCMC) approach is foreseen.