Planetary transit detection software applied on CoRoT blind test light curves and BEST data

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An automatic planetary transit detection software was developed in preparation for the space mission CoRoT. The software uses as detection algorithm a Boxed-Least-Square algorithm (BLS) and a variance analysis method. Two different filtering techniques (trend filtering and harmonic fitting) were applied in order to improve the signal-to-noise-ratio (SNR) of transit signals.

A Monte Carlo Analysis and theoretical studies were carried out in order to investigate the significance and distribution of the statistic of the BLS algorithm and to test the stability and reliability of the implemented transit search method.

The transit detection algorithm was applied to simulated CoRoT blind test data which proved that the algorithm is perfectly suited to detect periodic signals in light curves. In addition the algorithm was tested with BEST (Berlin Exoplanet Search Telescope) real light curves from CoRoT target stars observed during the years 2001-2003. The analysis of the BEST data reveals the existence of interesting events caused by periodic signals in the stellar light curves from variable stars and binary star systems.