

A Validation Method for Exoplanet Transit Candidates with Auto-Regressive Models.

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Abstract

Ultra-precise observations from space missions such as CoRoT, Kepler/K2 or TESS can be contrasted with data from ground-based surveys such as CARMENES or HARPS to validate extra-solar planets detection through spectroscopy or using different photometric bands to discard false positives. Though several thousands of exoplanets have already been confirmed the number of candidates is orders of magnitude higher. Since it is not possible to allocate time from ground-based surveys to perform the follow-up of all the candidates, an automatic validation procedure is required which is robust enough to confirm the detections. I introduce here a new validation method for exoplanet transit candidates based on modeling the data as auto-regressive processes. These can fit either stellar pulsations, stellar activity or any intrinsic variability so they are very suitable to model out of transit light variations. This procedure does not require any a priori from the star or planet such as period, depth, duration or shape of the signal. It neither does require any colors, spectroscopic observations or any informed assumptions, only one light curve with several transits is required.

Here I show that transits can be validated with no necessity of follow-up observations in many cases and false positives can be reliably identified with auto-regressive models.

My poster is available at <https://zenodo.org/record/7044837>