VARLET and PHALET two wavelet based filter methods to separate stellar variation, orbital disturbances and instrumental effects from transit events in CoRoT light curves.

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Abstract

Space missions such as Corot and Kepler have revolutionized the search for exoplanets by providing us with high-resolution stellar light curves. Various variations (star spots, pulsation, flares, glitches, hot pixels...), however, dominate the stellar light curves and mask the faint transit signals of in particular small exoplanets, which leads to a high rate of false detections, to be handled separately. Full automated filtering and detection algorithms make it possible, however, to manage the huge number of stellar light curves in order to search for transits.
The Rheinisches Institut f́ur Umweltforschung (RIU-PF) as one of the CoRoT detection teams has developed two model independent wavelet based filter techniques to improve the search for transits.

We present our two model independent wavelet based filter techniques.

VARLET separates faint transit signals from stellar variations without using a-priori information of the target star. VARLET distinguishes variations by frequency, amplitude and shape simultaneously and detects and corrects most instrument based jumps and glitches.

PHALET is used to separate periodic features independent of their shape. It is possible to separate diluting binaries and periodic Earth orbital effects. It is also used for multi transit search.
The combination of these filter techniques is sensitive to the detection of very faint transits in CoRoT light curves and reduces false alarms.

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