SPECTRAL ANALYSIS OF STELLAR TIME SERIES

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Asteroseismology is the study of the oscillations in stars – by observing a star’s change in brightness over time and studying periodic components in the power spectrum, inference can be made about a star’s internal processes. Of particular interest to astronomers are the frequency of the maximum oscillatory power and the spacing between consecutive modes. Recently, the Kepler spacecraft has collected thousands of time series data measuring the brightness of red giant stars. Although the data span four years, many gaps exist. I will describe a new time series analysis method as it applies to these data. The method [1] combines the Thomson (1982) multitaper approach for reducing spectral leakage and variance [2] with the Lomb–Scargle periodogram for uneven sampling [3, 4]. This method has the potential to improve estimates of oscillations compared to traditional methods.

References
1. A. Springford, *Spectral analysis of time series with latent and irregular times*, PhD Dissertation, 2017, Queen’s University, Kingston, ON, Canada. MR3768656