Period Estimation for Multiband Variable Stars

Detecting periodic variable stars is critical for many astronomical pursuits including determining distances to clusters. An important step in detecting periodic variable stars is estimating the period of a light curve. In this talk, we generalize the Lomb-Scargle period finding algorithm to multiband light curves. We incorporate constraints on phases and amplitudes across the different bands using a penalized likelihood function. We show how the penalized likelihood function is equivalent to a Bayesian prior probability distribution on phase and amplitude. We test our algorithm on I and V band Cepheid data collected by the Optical Gravitational Lensing Experiment (OGLE).