Using A Linear Regression Algorithm In Python To Quickly Find Variable Stars For Ensemble Photometry

Abstract

To measure the magnitudes of celestial objects, reference stars with stable magnitudes are used to account for fluctuations in Earth's atmosphere. If no such well-studied reference stars are within the field, other stars must be used so long as they are not variable. We created a Microsoft Excel spreadsheet which harbored a line**ar** regression algorithm to detect star variability and then transferred it to Python to make the process of finding variable stars faster. Via Python packages such as sklearn, numpy, scipy, etc., we were able to produce a quicker and simpler way to analyze the star variability from their raw CSV file data and their accepted magnitudes from an online database. The code was successfully tested on variable stars TZ Aurigae and BX Pegasi.

The images of candidate exoplanet EPIC210401157-b from the BSU Observatory did not contain any known reference stars. We used ensemble photometry, but this meant a higher margin of uncertainty in our measurement. Using stars that are the least variable in their magnitudes would

