

The study of short orbital period of delta scuti pulsating variable stars

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Abstract. As a pulsating star moves in its binary orbit, the path length of the light between us and the star varies, leading to the periodic variation in the arrival time of the signal from the star to us (earth). With the consideration of pulsators light arrival time delay effects several new methods which allows using Kepler photometric data (light curves) alone to find binary stars have been recently developed. Among these modern techniques we used binarogram method and we identified that several δ Sct pulsating stars have companions. The application of these method on detecting long periods(i.e. longer than about 50 d) δ Sct pulsating stars is not new, but the uniqueness of this study is we verified that it is also applicable to detect and determine the orbital elements of short periods (i.e short orbital period) δ Sct pulsating stars. With this investigation, we identified the possible way to overcome effects of fictious peaks, even, on the maximum peaks helpful to verify weather the star has companion or not depend up on the existence of the time-delay. Then, we applied the technique on known binary stars and their orbital elements are previously published. Finally, we identified some new short orbital period δ Sct pulsating stars and obtained their orbital frequency and period with the same procedures. Because of with our attempts we succeeded and verified the applicability of the method (the Binarogram method) on these stars (i.e short orbital period) for the first time, we expect that our present study will play a great role for similar study and to improve our binary statistics.

Keywords. stars: variable; stars: properties; stars: binary.