

Abstract Submitted
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Kozai mechanism and the dynamics of highly inclined planetary orbit in HD 196885 binary system SUMAN SATYAL, Univ of Texas, Arlington, BILLY QUARLES, NASA Ames Research Center, Moffett Field, CA, TOBIAS HINSE, Korea Astronomy and Space Science Institute, Daejeon, Republic of Korea, JOAQUIN NOYOLA, Univ of Texas, Arlington — About 1/3 of the stars in the Milky Way are believed to be in binary; however, among the confirmed 905¹ exoplanets only 7% are found to orbit binary stars. Depending on the orbits around the host star(s) a planet could be S-type, orbiting either one of the binary, or P-type, orbiting both of the binary. We have studied the dynamics of an S-type planet in HD 196885 AB considering the perturbation due to the secondary companion and with an emphasis on higher orbital inclination (i_{pl}) within the binary plane. Mean exponential growth factor of nearby orbits (MEGNO) maps are used as a chaos indicator to determine regions of likely orbital stability for the various choices of i_{pl} , semi-major axis and longitude of ascending node (Ω). Based on our analysis we have quantitatively mapped chaotic and quasi-periodic regions of the system's phase space. By inspection of the resonant angle we study the qualitative behavior of the argument of periapsis and find it to librate or circulate as a consequence of Kozai oscillations. Also, based on our stability analysis, an attempt has been made to constrain the possible higher mass limit of the planet and improve upon the current ephemeris with a more consistent dynamical model.

¹<http://exoplanetarchive.ipac.caltech.edu/index.html>

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