Determination of the Orbital Elements of Near-Earth Asteroid 1999 LO28 Using the Method of Gauss

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The objective of the research was to generate the orbital elements of the asteroid 1999 LO28 in order to better study its orbit and assess its potential threat for planetary collision. To achieve these ends, images of the asteroid were taken on ♀five separate nighttime observation runs which were used as the core data. The images were then reduced and aligned before determining the position of the asteroid at several different times. This positional information was then used to generate initial vectors from the Method of Gauss by writing Python code. The Method of Gauss is a means of determining the position and velocity vectors of an object in orbit given a minimum of three observations. Once these vectors were determined, they were used to determine the orbital elements of 1999 LO28. From the calculated results, one can conclude that 1999 LO28 is a member of the Amor family of Near-Earth Asteroids which do not cross into Earth's orbit at any point. Finally, it was found that this asteroid would collide with the Sun in about 200 million years, as its orbital elements change over time.

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