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Will 3552 Don Quixote Escape from the Solar System?

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Asteroid 1983 SA, well known as 3552 Don Quixote, is one of Near Earth Asteroids (NEAs) which is the most probable candidate for the cometary origin, or otherwise as Jupiter-Family-Comets (JFCs). The aim of this study is to investigate the possibility of 3552 Don Quixote to be ejected from the Solar System. This paper presents an orbital evolution of 100 hypothetical asteroids generated by cloning 3552 Don Quixote. Investigation of its orbital evolution is conducted by using the SWIFT subroutine package, where the gravitational perturbations of eight major planets in the Solar System are considered. Over very short time scales (~220 kyr) relative to the Solar System life time (~10 Gyr), the asteroid 3552 Don Quixote gave an example of chaotic motion that can cause asteroid to move outward and may be followed by escaping from the Solar System. Probability of ejection within the 220 kyr time scale is 50%.

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