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# Algorithm for identifying the transfer trajectory between two elliptic orbits

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*This article for the first time ever presents an algorithm for the transfer elliptic orbit between two elliptic orbits. We have solved the following problems: constructing the ellipse in two radius-vectors emerging from the same focal point, calculating acceleration and deceleration velocities impulses, computing the deceleration needed for the orbit plane change. This study is of great importance because the other well-known publications either do not consider such problems or do not suggest particular computation algorithms. We have calculated the transfer orbit length by the numerical quadrature method. The motion along the elliptic orbit is viewed as the superposition of the circular and radial motions. It is shown that with the increase of the transfer ellipse semi-major axis length its eccentricity also increases. It results in the increase of the spacecraft radial velocity in the transfer orbit whereupon the acceleration and deceleration velocities also increase.*

**Keywords:** *transfer orbit, elliptic orbit, flight trajectory to Mars, numerical quadrature method*

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