Results Description

A screenshot of a cell phone

Description automatically generated

# Stable Orbits

Videos have been processed on stable orbits in the stationary frame, showing stability over large numbers of orbits. This required stiff integration solvers, which also dramatically reduced the deviation from the Lagrange point in the moving frame too.

A close up of a map

Description automatically generatedThis is depicted here, with deviation from the Lagrange point in the rot frame on the order of e-13 AU.

The solver is much less accurate in the stationary frame, as deviation from Lagrange point here is in the order of e-2 AU. This is because the position values are changing and non-zero.

# A screenshot of a cell phone Description automatically generatedWander Against Perturbation Size

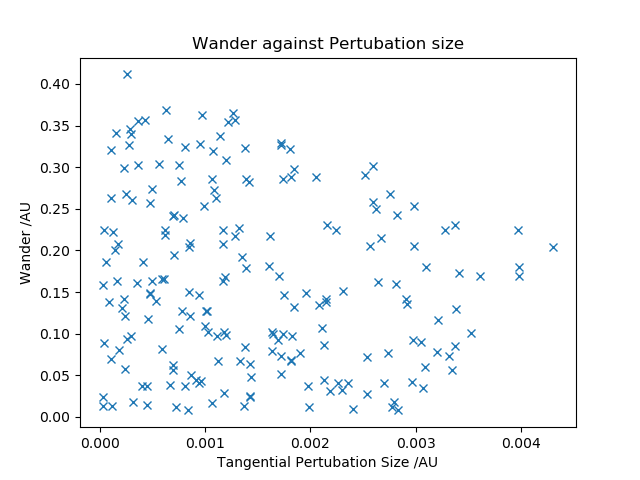
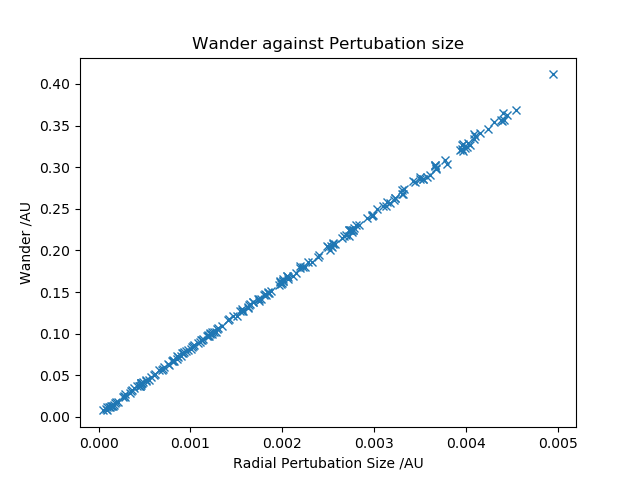
There is no obvious connection when considering perturbations of maximal magnitude 0.1, relative to the Lagrange point.

A screenshot of a cell phone

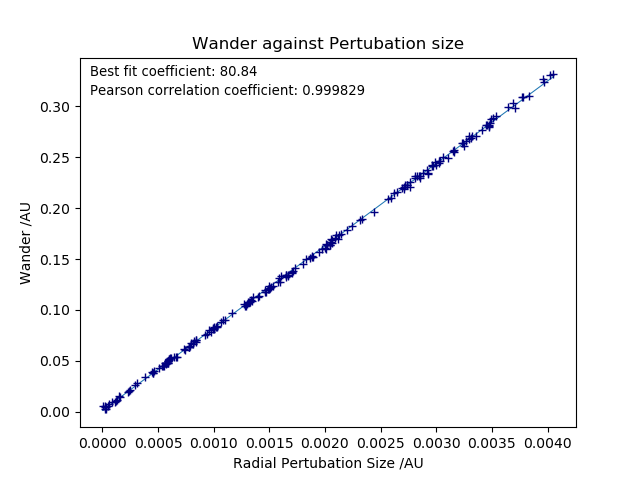
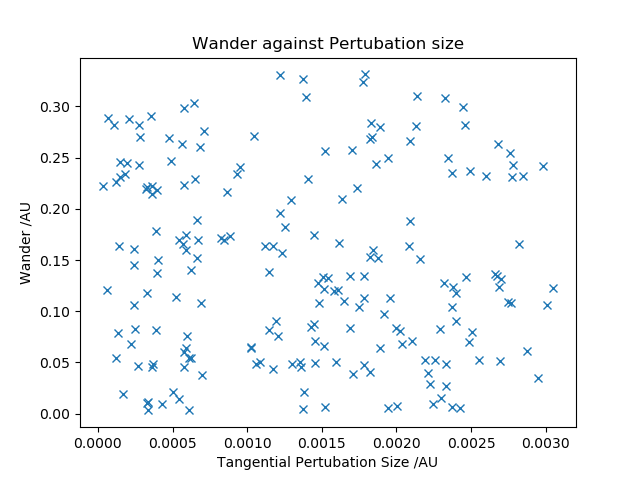
Description automatically generated

If perturbation size is set to 0.001, the relationship is capped at linear. This could be related to perturbation direction, so radial displacements result in maximal wander and this sets the linear relation cap, while tangential perturbations to not result in wander. This is wander from Lagrange point, however there is a similar relationship for wander from initial point

This can be clearly split into radial and tangential components as predicted:



Note the uneven distribution of points is a result of random sampling within a square not a circle, so higher radii are less likely as the correspond to the corners of the square. This is corrected below, with uniform sampling of points within a circle (rejecting points outside it in rectangle).



# Wander in Position/Velocity Space

These mesh plots show the deviation of wander in position and velocity space. They show that tangential position displacements and radial velocity perturbations give no wander and it is only the components orthogonal to these that are significant. Taken over 50 orbits, 30 points per orbit, 30 pixels across.

