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Title: *"The evolution of the Line of Variation at close encounters"*
Abstract. The outcome of the first planetary fly-by occurring after the start of the dynamical evolution of a planet crossing small body strongly depends on its coordinates on the target plane of the encounter. The uncertainty associated to these coordinates is a function of the uncertainty in the orbital elements at the time of the encounter, and it is easy to show that in most cases of interest it is dominated by the uncertainty in the time of closest approach. A suitable choice of the target plane coordinates is such that one coordinate represents the minimum distance between the orbit of the small body and that of the planet, and the other is proportional to the timing of the encounter. In this way, the uncertainty is mostly along a line parallel to one of the coordinate axes, the so-called Line of Variation (LoV). The LoV approach is a crucial ingredient of the Impact Monitoring software developed at the University of Pisa and at the JPL, whose outputs are available on the risk pages of NEODyS (`http://newton.dm.unipi.it/neodys/index.php?pc=4.1`) and Sentry (`http://neo.jpl.nasa.gov/risk/`). In this study the post-encounter evolution of fictitious small bodies belonging to the LoV is studied in the framework of the analytic theory of close encounters, and the results are compared, whenever possible, with those of numerical integrations.