

ATELIER  
« MOUVEMENTS PLANÉTAIRES, DYNAMIQUE DES SATELLITES ET ORBITES DES ENGIN SPATIAUX »  
22–26 JUILLET, 2013

WORKSHOP  
“PLANETARY MOTIONS, SATELLITE DYNAMICS, AND SPACESHIP ORBITS”  
JULY 22–26, 2013

## Hyperbolic normal forms, analytic computation of invariant manifolds and applications in astrodynamics

Christos Efthymiopoulos \*

[cefthim@academyofathens.gr](mailto:cefthim@academyofathens.gr)

<http://astro.academyofathens.gr/web/personnel.html>

---

The talk will focus on analytical methods of computation of the invariant manifolds emanating from unstable periodic orbits in conservative nonlinear dynamical systems. In particular, we will present results regarding the domain of convergence of hyperbolic normal form series, as well as the computation of homoclinic orbits or orbits of high period around the homoclinic ones using only series. Regarding the convergence, we will discuss the conditions under which it is possible to ‘extend’ the original domain of convergence established in theorems by Moser (1956, 1958) and Giorgilli (2001). Finally, we will discuss applications of the hyperbolic series in astrodynamics, i.e. in the study of dynamics of both natural (e.g. asteroidal) or artificial bodies.

---

\*Research Center for Astronomy, Soranou Efessiou 4, Athens, GR-11527, GREECE.