

# **The outer planets of the Solar System and the Pioneer anomaly**

L. Iorio (1), G. Giudice (2)

(1) Viale Unità di Italia 68, I-70125 Bari, Italy (lorenzo.iorio@libero.it), (2) Dipartimento di Progettazione e Gestione Industriale, Piazzale Tecchio 80, I-80125 Napoli, Italy (giudice@unina.it)

The so-called Pioneer anomaly consists in an anomalous, constant acceleration of  $8.74 \times 10^{-10} \text{ m s}^{-2}$  radially directed towards the Sun which arose after the Pioneer spacecraft passed the threshold of 20 AU. In this talk we investigate, from a purely phenomenological point of view, the effects that such an acceleration, if present in the outer region of the Solar System beyond 20 AU, would induce on the orbital motions of Uranus, Neptune and Pluto. We perform both analytical calculation and numerical simulations of the temporal evolution of the planetary Keplerian orbital elements and of right ascension and declination. Then, we compare such results with the latest astronomical data available. It turns out that the resulting anomalous orbital features of motion would be quite large and well detectable, but there is no trace of them in the currently available observations.