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THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

PHD STUDENT SEMINAR

Moser Regularization Map and Symmetry Group of the Kepler Problem

By

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Abstract (*)

The n-dimensional classical Kepler problem has energy, angular momentum, Laplace-Runge-Lenz (LRL) vector as its integral of motions. Among which, the symmetry group SO(n) generated by angular momentum is explicit in the phase space, while that generated by LRL vector is implicit. Moser regularization map ι_E: $\Sigma_E \to (TM_E)_1$ is a canonical transformation from the energy surface Σ_E of the Kepler problem onto a dense open subset of $(TM_E)_1$, the tangent bundle TM_E restricted to the cross sections with tangent vector magnitude = 1, where M_E is a sphere if E<0, a Euclidean space if E=0, and a pseudosphere if E>0. This map respects the symmetry group, so that the implicit symmetry in the phase space pushforwards to the explicit symmetry in the regularized space, which is SO(n+1) if E<0, ISO(n) if E=0, and $SO_0(1,n)$ if E>0.

Date : 10 May 2024 (Friday)

Time : 4:30pm

Venue : Room 4475 (Lifts 25/26)

All are Welcome!