Instability and Bifurcation

Course Program

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The course is divided into 8 lectures of approximately two hours each, that will be given on Tuesdays and Thursdays from 3pm to 5pm (time in Italy, UTC+1), starting on Thursday Nov. 4th, until Tuesday Nov. 30th. We will give below a short description of each lecture.

1. Nov 4: Introduction, and generalities on geometric variational problems on Riemannian manifold. Riemannian Geometry, affine connections, curvature, geodesics, Jacobi fields and conjugate points. The Morse Index Theorem.


3. Nov 11: Global bifurcation results. Rabinowitz theorem. The abstract theory will be presented with the discussion of a simple concrete problem, that will be studied in detail: global bifurcation for a class on nonlinear Yamabe-type ODEs (arXiv:2107.08181).

4. Nov. 16: Bifurcation in the geodesic variational problem: the fixed endpoints case, the free endpoints case, and the periodic case. Timelike and lightlike geodesics in Lorentzian manifolds, with general relativistic interpretation.


