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*Parameterization of invariant manifolds for periodic orbits of vector fields*

Invariant sets and connecting orbits provide several information about the long term behaviour of nonlinear system.

If the invariant sets are hyperbolic, the connecting orbits may be found in the intersection of stable and unstable manifolds. In this talk we consider periodic orbits as invariant sets and we present an efficient numerical method for computing Fourier-Taylor expansion of invariant stable/unstable manifolds.

A fundamental ingredient in our construction is the Floquet theory. Indeed by continuously exploiting the Floquet normal form, the computation of the Fourier-Taylor coefficients results in solving algebraic equations with constant coefficients. The technique does not require any rigorous integration and permits fast computation of the parameterisation up to any desired order also for high dimensional manifolds. Moreover the method is well suited for a subsequent rigorous validation of the computed parametrisation.

Joint work with Jean-Philippe Lessard and Jason D. Mireles James.