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Figure-eight solution and slalom solutions in function space

The figure-eight solution is a choreographic solution to equal mass planar three-body problem in homogeneous potential $U = \sum 1/r_{ij}^\alpha$ for $\alpha > -2$, found by Moore, Chenciner and Montgomery. Choreographic solution is a periodic solution in which three bodies share single closed orbit with equal time delay. Slalom solutions are choreographic solutions that have the same homotopy as k -times repeated figure-eight solution, found by Dmitrašinović and Šuvakov.

We trace the figure-eight solution and slalom solutions with $k = 5$ around $\alpha = 1$ numerically. They are mutually close in function space for some interval of α . The $k = 5$ slalom solutions exist roughly in $0.8 < \alpha < 1.3$. Some end points are pair annihilation/creation of two solutions, and the others are single solutions with two-body collisions. We investigated closely the pair annihilation/creation.

This is a joint work with Hiroshi Fukuda and Hiroshi Ozaki.