

*Morse index and periodic solutions bifurcated from the figure-eight choreography for the equal mass three-body problem*

Hiroshi Fukuda, Kitasato University

*E-mail address:* fukuda@kitasato-u.ac.jp.

We report on Morse index and periodic solutions bifurcated from the figure-eight choreography for the equal mass three-body problem under homogeneous potential  $-1/r^a$  and Lennard-Jones (LJ) type potential  $1/r^{12} - 1/r^6$ . We found a relationship between figure-eight choreography under homogeneous potential and H solution found by Simó through Morse index  $N(a)$ . The H solution is periodic and consists of three distinct eight-shaped orbits. It coincides with figure-eight choreography at  $a = 0.9966$  where  $N(a)$  changes. We show every change of Morse index corresponds to bifurcation of such a periodic solution from figure-eight choreography. For the system under LJ type potential, the figure-eight choreography with period  $T$  is not scalable. We confirmed that changes of its Morse index in  $T$  also correspond to bifurcations for figure eight choreography tending to that under potential  $-1/r^6$  when  $T \rightarrow \infty$ . All periodic solutions by bifurcation we found are less symmetric like H solution than figure-eight choreography.

This is a joint work with Toshiaki Fujiwara and Hiroshi Ozaki.