Reduction of Symmetries in the N-body Problem

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Abstract: The reduction of symmetries in the three-body problem is best understood by first forgetting the dimension of space. This amounts to considering the problem in a four dimensional euclidean space and this is indeed what Lagrange did in 1772 in his famous "Essay on the three-body problem". There, the "constraint" of being in a three dimensional space is expressed by equating to zero one of the three first integrals of the reduced equations. I shall describe the generalization that Alain Albouy and I gave in 1998 of Lagrange's result. In contrast with central configurations which admit only periodic relative equilibrium motions, I shall show that, if the dimension is at least four, there exist "well balanced" configurations which admit quasi-periodic relative equilibrium motions.

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