ON THE DESTRUCTION OF RESONANT LAGRANGEAN TORI IN HAMILTONIAN SYSTEMS

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Poincaré's fundamental problem of dynamics concerns the behaviour of an integrable Hamiltonian system under a (small) non-integrable perturbation. Under rather weak conditions K(olmogorov)A(rnol'd)M(oser) theory settles this question for the majority of initial values. The perturbed motion is (again) quasi-periodic, the number of frequencies equals the number of degrees of freedom. KAM theory proves such Lagrangean tori to persist provided that the frequencies are bounded away from resonances by means of Diophantine inequalities.

How do Lagrangean tori with resonant frequencies behave under perturbation ? We concentrate on a single resonance, whence many n-parameter families of n-tori are expected to be generated by the perturbation ; here n+1 is the number of degrees of freedom. For quasi-convex systems we explain the pattern how these families of lower-dimensional tori come into existence, and then discuss what happens if the assumption of quasi-convexity is dropped.