

Degenerate singularities in $(1 : \pm m)$ -oscillators

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Abstract

Kalashnikov conjectured that there are six generic degenerate singularities that may appear in 2-degree-of-freedom integrable systems in resonance. One of them is the well-known cusp, whilst two more are known in systems with $(1 : \pm 2)$ resonance, but are not encountered frequently. Degenerate singularities in resonance $(1 : \pm 3)$ or higher has not been discovered before. Here we provide a family of integrable systems displaying all six generic degenerate singularities from Kalashnikov's list.