

Hamiltonian Hopf bifurcations in Gaudin models

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We show that $\mathfrak{su}(2)$ rational and trigonometric Gaudin models, or in other words, generalised coupled angular momenta systems, have singularities that undergo Hamiltonian Hopf bifurcations. In particular, we find a normal form for the Hamiltonian Hopf bifurcation up to sixth order, letting us determine when the bifurcation is degenerate or not. Furthermore, in the non-degenerate case we may use the fourth order terms to determine whether the bifurcation is supercritical or subcritical, whether a flap appears in the image of the momentum map or not. Finally, plots and figures illustrating some of the bifurcations taking place in $\mathfrak{su}(2)$ Gaudin models are presented, showing that there are more bifurcations occurring than only Hamiltonian Hopf ones.