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A note on the number of periodic orbits near a resonant equilibrium point.

Nonlinearity **2** (1989), *no.* **3**, 445–458.

The author discusses the number M of periodic orbits of period T near a resonant equilibrium point. Based on Lefschetz theory (the complex version of Morse theory), the author derives a formula for the number $M(n, d)$ of complex nonlinear normal modes in the $(n + 1)$ -degrees-of-freedom system with Hamiltonian $H_2 + \tilde{H}$, where H_2 describes a system of $(n + 1)$ uncoupled oscillators with the same frequency (the so-called $(1:1:\cdots:1)$ resonance) and $\tilde{H}$ is a generic homogeneous perturbation of degree $2d$ which Poisson-commutes with H_2 . The formula is $\sum_{n \geq 0} M(n, d)T^n = (1 - T)^{-3/2}[1 - (2d - 1)^2T]^{-1/2}$.

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