Efficient capture of nonlinear oscillations into resonance

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The problem of efficient capture of nonlinear oscillations into resonance is discussed. The capture is guaranteed by passage through resonance when the system starts in equilibrium and the driving amplitude exceeds a threshold. The threshold problem is described by a universal nonlinear Schrodinger-type equation with a single parameter and can not be analyzed by perturbation methods. A similar threshold phenomenon is characteristic of two weakly coupled oscillators with a slow parameter if one of the oscillators starts in equilibrium, allowing efficient capture into resonance and subsequent adiabatic (autoresonant) control of strongly excited nonlinear oscillations.

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