Summary: We consider the dynamics of a nonlinear resonator that is nonlinearly coupled to a linear resonator that has a relatively short decay time. In this case, the secondary (linear) resonator adiabatically tracks the primary (nonlinear) resonator. This model, which is motivated by ongoing experimental work in nano-resonators, is analyzed analytically and numerically to show that the linear and nonlinear characteristics of the primary resonator can be altered in a significant manner by the coupling to the secondary resonator. Such an arrangement may provide a practical means of tuning resonator characteristics in applications.

MSC:

70K30 Nonlinear resonances for nonlinear problems in mechanics
34C15 Nonlinear oscillations and coupled oscillators for ordinary differential equations

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