

**Title:** Surprises of the transformer as a coupled oscillator system

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**Abstract:** We study a system of two RLC oscillators coupled through a variable mutual inductance. The system is interesting because it exhibits some peculiar features of coupled oscillators: (i) there are two natural frequencies; (ii) in general, the resonant frequencies do not coincide with the natural frequencies; (iii) the resonant frequencies of both oscillators differ; (iv) for certain choices of parameters, there is only one resonant frequency, instead of the two expected.

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