

**ROTOR UNBALANCE-RELATED LATERAL/TORSIONAL  
VIBRATION COUPLING LEADING TO SELF-EXCITED VIBRATIONS**

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**ABSTRACT**

This paper analyses the lateral and torsional coupling of an anisotropic rotor due to unbalance, based on a model, which includes one torsional and two lateral modes. In certain regions of rotational speed, the rotor motion is unstable, leading to limit cycle self-exciting vibrations. The model with specific class of stiffness nonlinearity allows obtaining exact solutions for the self-exciting vibrations. A numerical example is presented.

**Keywords:** Rotor lateral/torsional coupled vibrations, rotor instability, self-excited vibrations.