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VibronRotor, an opensource rotordynamic code: Development and benchmarking

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Abstract

Precise prediction of dynamic response is an important first step in the design and troubleshooting of rotating machinery. Utility of the finite element (FE) method in rotordynamics is well entrenched and has translated into many specialized codes for rotor response prediction. Most specialized codes are propriety software with expensive subscriptions which restrict the access for small-scale rotating machinery manufacturers and researchers to these codes and employed algorithms. In contrast, this paper presents the detailed algorithm and benchmarking of an open-source FE code VibronRotor for rotordynamic analysis. FE formulation in code is based on the work of Nelson and McVaugh[1]. Functionalities of the code include Campbell diagram, critical speed map, mode shapes, imbalance response, orbit plots, and instability threshold analysis. An important