



Solid Modeler Implemented Rotordynamics

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Deliverables: This project aims to provide TRC members with a stand-alone rotordynamics software (compiled in C code) which runs under the new EXCEL system umbrella without any other software (Matlab, Fortran..., etc.) installation. In addition, we will work with member companies to validate the code with actual test data.

Functions: This software allows users to import the rotor system (including shaft, disk, casing, support structure, etc.) modeled in various CAD software (SolidWorks, Siemens NX, etc.) and then conduct rotordynamic finite element analysis.

Features: Our software is able to generate 3-D rotor mesh or read in 2-D/3-D mesh models of the rotor, stator, and flexible support structures from CAD software (SolidWorks, Siemens NX, etc.); predict critical speed, damping factor, log decrement, and unbalance response. Gyroscopics, shear deformations, translational and rotary inertias, axial load and torque, asymmetric stiffness and damping coefficients of bearing, centrifugal stiffening effects are all accounted for.

Future work: We will develop code to include internal damping, which is caused by the micro-slip and rubbing or hysteretic friction between rotating shrink-fitted parts or between rotor and seal; viscoelastic shaft and coupling spool pieces; automatic transfer function generation for 3-D flexible support structures.