FEMRDYN
Capability Summary

DynaTech
Engineering, Inc.

Roseville, California

FEMRDYN Features

- ❖ **Platform independent GUI (100% Java)**

- ❖ **6 DOF conical beam finite element shafting**

- ❖ **Linear and nonlinear traditional supports**

- ❖ **Comprehensive magnetic bearing models**

- ❖ **Natural frequency and forced response**

- ❖ **Integrated graphical displays**

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Platform Independent Java GUI

Advanced Finite Element Model

❖ **Conical beam elements**
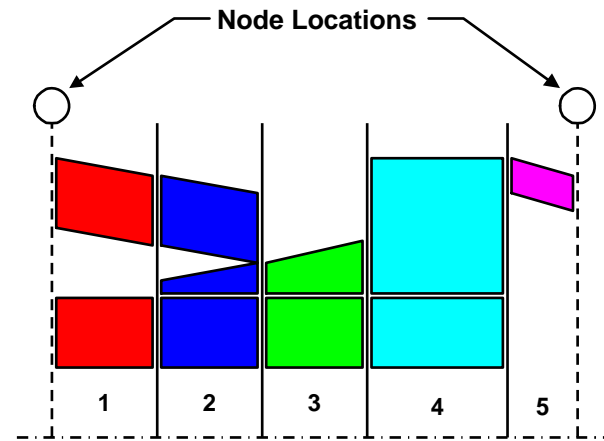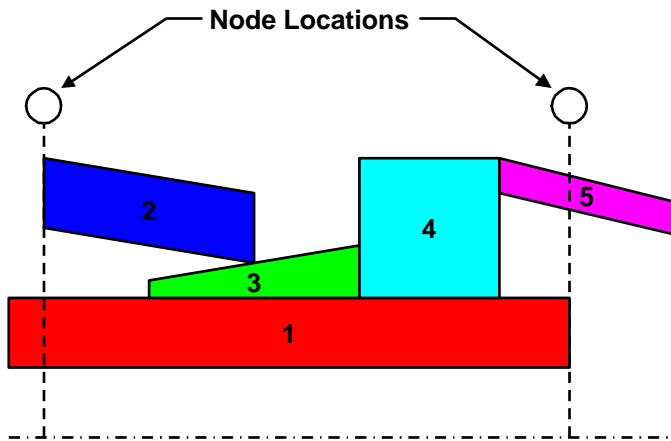
❖ **Automatic segment discretization**

❖ **Unlimited problem size**

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Linear and Nonlinear Supports

❖ **Standard speed dependent linear coefficients**

❖ **Force-displacement**

    – **Tip rubs**

    – **Deadband**

    – **Auxiliary bearings**

❖ **Squeeze films (long and short)**

F vs δ

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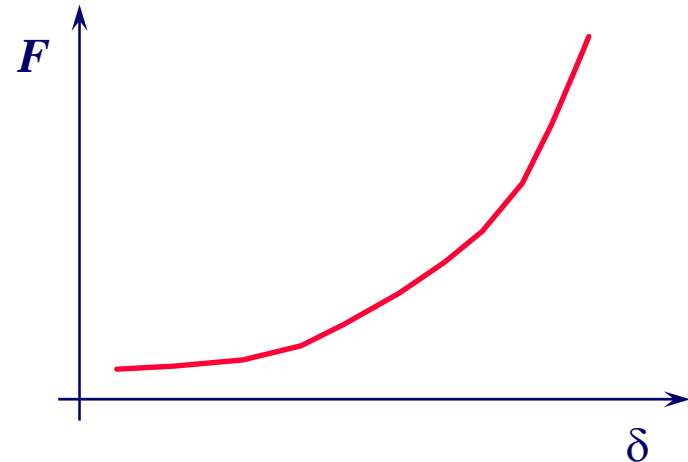
Complete Magnetic Bearing System Analysis

Magnetic Bearing System

| Sensors | (V) | Sensor Groups | (V) | Controllers | (I) | Amplifiers | (I) | Actuators |

Casing and Shaft Displacements ← Shaft Motion ← Casing and Shaft Forces

Rotor Dynamic System

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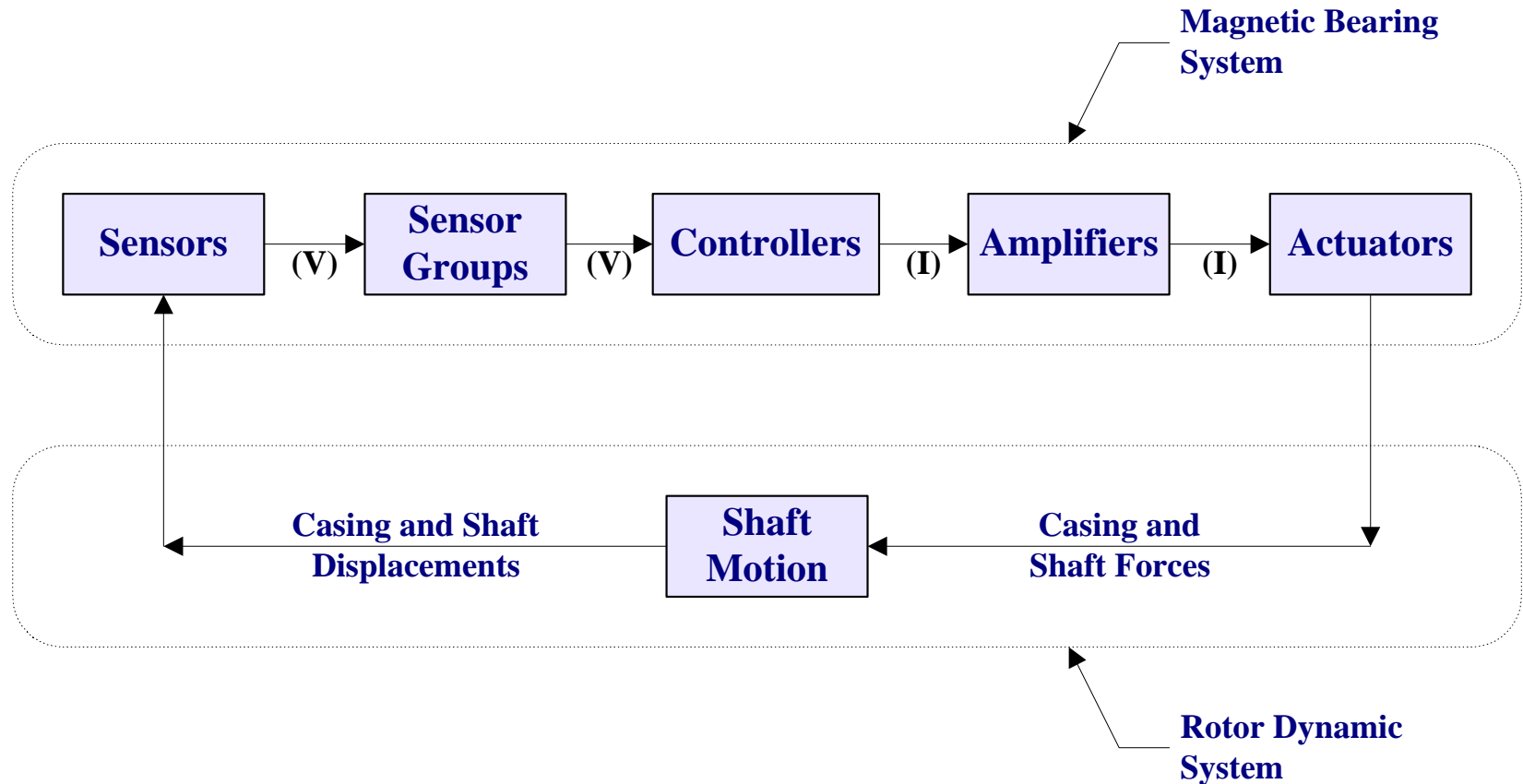
Full Set of Graphical Displays
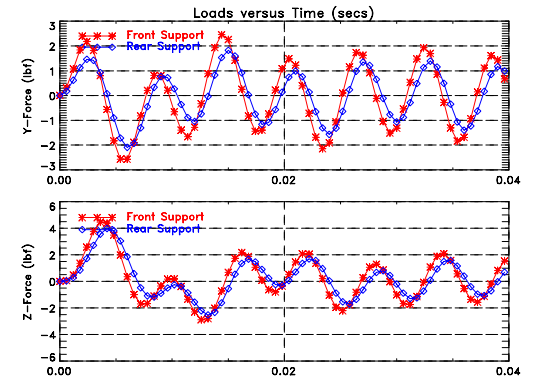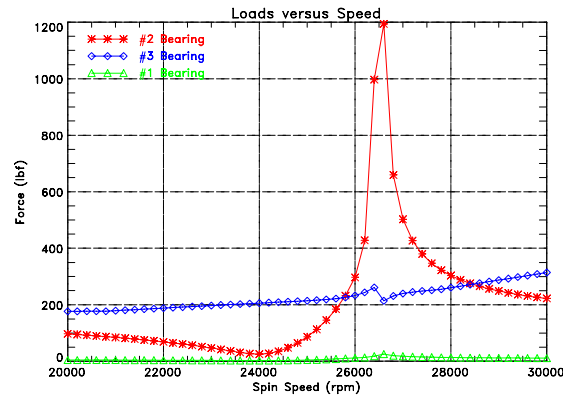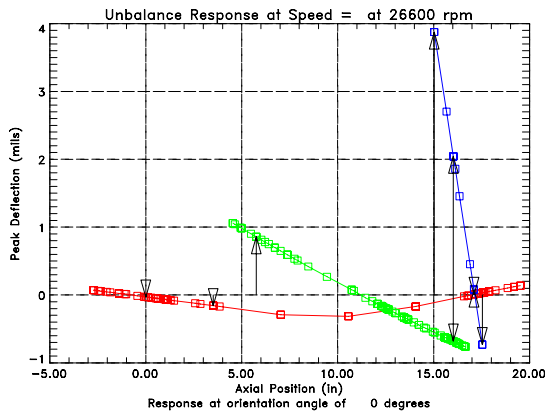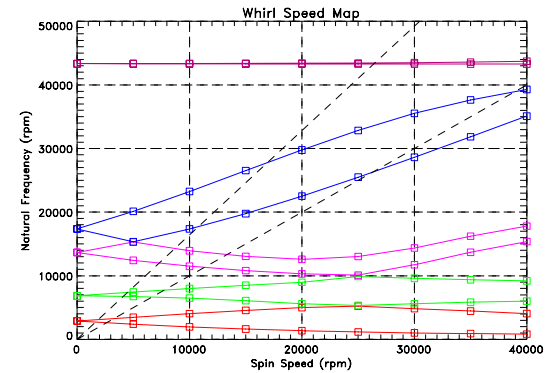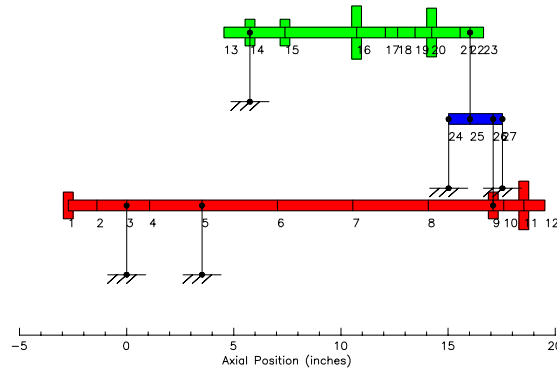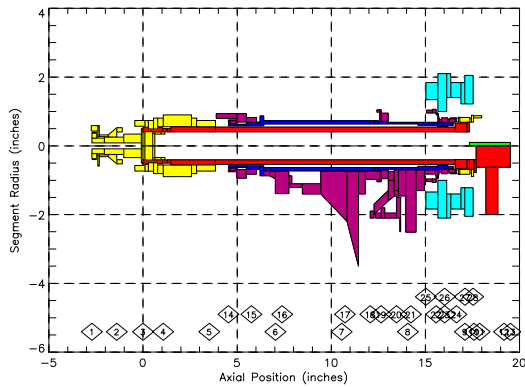
Comprehensive Analysis Options

❖ **Lateral, Torsional, and Axial analyses**

❖ **Damped natural frequencies**
  – **Whirl and Stability maps**
  – **Mode shapes**

❖ **Steady and Transient forced response**
  – **Unbalance, frequency, maneuver, and time loads**
  – **Displacements, support loads, and response shapes**

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Very General Nodal Forces

❖ **Radial, Angular, Torsional, and Axial forces**

❖ **Loads are frequency and time dependent**
  – **Constant, frequency based, and phased forces**
  – **Loads can be started and stopped at various times**

❖ **Forces are combined with other loads**
  – **Nodal loads summed with unbalance**
  – **Loads are frequency independent (asynchronous)**

Advanced, Validated Design Tool

- ❖ **6 DOF conical beam finite elements with automatic discretization**

- ❖ **Complete set of support options**

- ❖ **Speed and time based analysis**

- ❖ **Comprehensive display and reporting**

- ❖ **Analytical predictions validated from Air Force and NASA rig testing**

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