

# **Thermo-Mechanical Behavior of Rotor with Rubbing**

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## **ABSTRACT**

The paper presents the analytical study of dynamics and stability of rotors subjected to rubbing due to a contact with seals, with the account for associated thermal effect. The seal interaction force, acting on the shaft, gives rise to a friction force, which is a source of heating, and can induce the so-called “*spiral vibrations*”. A mathematical model has been developed, which couples the heat conduction equation with the equations of motion for the rotor. The numerical simulations have been conducted showing the thermo-mechanical behavior of the rotor at different operating conditions. The procedure for stability analysis of the multi-bearing rotors based on the system eigenvalue analysis and state-space approach has been proposed. Finally, the experimental data related to the full annular rub have been presented.

**Keywords:** rotor rubbing, spiral vibration, thermal bow, contact force, stability.