



14th International Conference on Dynamics of Rotating Machines
Gdańsk, Poland, 17th – 19th February 2021



Programme

17.02.2021 (Wednesday)

Opening

11:00 – 11:50

Chairmen: Tomasz Szolc and Grzegorz Żywica

Welcome by the Director of the Institute of Fluid Flow Machinery, Polish Academy of Sciences

Jan Kiciński

Welcome by the Director of the Institute of Fundamental Technological Research, Polish Academy of Sciences

Tadeusz Burczyński

History of the SIRM conference as seen by an enthusiast from Poland

Tomasz Szolc

Gdańsk as a conference venue

Practical information on the online conference

Grzegorz Żywica

Session 1 – Rotor Dynamics 1

12:00 – 13:00

Chairman: Richard Markert

12:00 – 12:20

Balancing of flexible rotors by means of calculated influence coefficients

Paper ID-17

Rainer Nordmann, Eric Knopf, Thomas Krueger, Bastian Abrate

12:20 – 12:40

Quasi-analytical solutions for the whirling motion of multi-stepped rotors with arbitrarily distributed mass unbalance running in anisotropic linear bearings

Paper ID-19

Michael Klanner, Marcel S. Prem, Katrin Ellermann

12:40 – 13:00

State of the art rotordynamic analyses of pumps

Paper ID-33

Frédéric Gaulard, Joachim Schmied, Andreas Fuchs

Session 2 – Bearings and Seals

14:00 – 15:40 Chairman: Horst Ecker

14:00 – 14:20
Paper ID-39 **Consideration of fluid inertia and cavitation for transient simulations of squeeze film damped rotor systems**
Thomas Drapatow, Oliver Alber, Elmar Woschke

14:20 – 14:40
Paper ID-35 **Study of the load capacity and vibration stability of rotors supported by hydrodynamic bearings lubricated by magnetically sensitive oil**
Jaroslav Zapoměl, Petr Ferfecki

14:40 – 15:00
Paper ID-42 **Simulative investigation of rubber damper elements for planetary touchdown bearings**
Benedikt Schüßler, Timo Hopf, Stephan Rinderknecht

15:00 – 15:20
Paper ID-72 **Alternative materials for tilting pad thrust bearings operating in start stop regime**
Michał Wasilczuk, Michał Wodtke

15:20 – 15:40
Paper ID-46 **Analysis of dynamical behaviour of rotors under axial load supported by full-floating disk thrust bearing**
Steffen Nitzschke, Christian Ziese, Elmar Woschke

Scientific Committee Meeting

16:00 – 18:00 Meeting Organiser: Tomasz Szolc

18.02.2021 (Thursday)

Session 3 – Balancing and Stability

09:00 – 10:20 Chairman: Katrin Ellermann

09:00 – 09:20
Paper ID-22 **Balancing of a linear elastic rotor-bearing system with arbitrarily distributed unbalance using the numerical assemble technique**
Georg Quinz, Marcel S. Prem, Michael Klanner, Katrin Ellermann

09:20 – 09:40
Paper ID-26 **Investigating the influence of rolling friction on the stable operation of automatic balancing units**
Lars Spannan, Elmar Woschke

09:40 – 10:00
Paper ID-30 **Excited vibration cases in critical machinery**
Piotr Miałkowski, Nicolas Péton

10:00 – 10:20 **Bifurcations and instability mechanisms in rotor systems generated by nonlinear bearings of complex design and elastic pedestals**
Paper ID-51
Lysandros Anastasopoulos, Athanasios Chasalevris

Session 4 – Rotor Dynamics 2

11:00 – 12:40 Chairman: Stephan Rinderknecht

11:00 – 11:20 **Run-up simulation of a floating ring supported turbocharger rotor with thrust bearing considering mass-conserving cavitation**
Paper ID-27
Christian Ziese, Cornelius Irmischer, Steffen Nitzschke, Elmar Woschke

11:20 – 11:40 **Run-up simulation of an automotive turbocharger rotor using an extensive thermo-hydrodynamic bearing model**
Paper ID-34
Cornelius Irmischer, Christian Ziese, Martin Kreschel, Elmar Woschke

11:40 – 12:00 **SBFEM for the Reynolds equation in rotordynamic simulations**
Paper ID-55
Simon Pfeil, Hauke Gravenkamp, Fabian Duvigneau, Elmar Woschke

12:00 – 12:20 **High speed drop down in a planetary touch-down bearing of an outer rotor flywheel system**
Paper ID-41
Benedikt Schüßler, Timo Hopf, Daniel Franz, Maximilian Schneider, Stephan Rinderknecht

12:20 – 12:40 **Presentation of the conference sponsors: ENVIBRA & DEWESoft**

Session 5 – Rotor Dynamics 3 & Vibration Control

13:20 – 15:00 Chairman: Rainer Nordmann

13:20 – 13:40 **Active vibration control of a gyroscopic rotor using experimental modal analysis**
Paper ID-18
Jens Jungblut, Christian Fischer, Stephan Rinderknecht

13:40 – 14:00 **Stability and sensitivity analysis of lateral vibrations of the rotating machines with overhung rotors**
Paper ID-36
Tomasz Szolc, Robert Konowrocki

14:00 – 14:20 **Dynamic characteristics of a high-speed supercritical rotor with a significant overhang**
Paper ID-15
Grzegorz Żywica, Paweł Zych, Małgorzata Bogulicz

14:20 – 14:40 **Investigation of steady-state harmonic axial and torsional vibrations of linear rotors under arbitrarily distributed loading using the Numerical Assembly Technique**
Paper ID-54
Bernhard Blümel, Michael Klanner, Katrin Ellermann

14:40 – 15:00 **Model-based residual unbalance identification for rotating machines**
Paper ID-56 Satish Bastakoti, Tuhin Choudhury, Risto Viitala, Emil Kurvinen, Jussi Sopanen

Session 6 – Case Studies

15:20 – 17:00 Chairman: Joachim Schmied

15:20 – 15:40 **Turbogenerator train high level 0.9X vibration problem – from test plan to resolution**
Paper ID-31 Piotr Miałkowski

15:40 – 16:00 **Integral Gear Compressor diagnostics assisted by rotor-bearing model**
Paper ID-32 Piotr Miałkowski

16:00 – 16:20 **Virtual framework for the torque load application system of a 10 MW test bench for nacelles of wind turbines**
Paper ID-57 Muhammad Omer Siddiqui, Paul Feja, Mohsen Neshati

16:20 – 16:40 **SSS clutch issue**
Paper ID-28 Sergey Drygin, Nicolas Péton, Sunghwan Kim

16:40 – 17:00 **Failure analysis of impeller made of martensitic precipitated hardening stainless steel in moist hydrogen sulfide environment**
Paper ID-49 Jakub Łagodziński, Zbigniew Kozanecki, Eliza Tkacz

19.02.2021 (Friday)

Session 7 – Foil Bearings

09:00 – 10:40 Chairman: Ilmar F. Santos

09:00 – 09:20 **A novel approach to designing gas foil bearings - concept, numerical simulations and prototype construction**
Paper ID-73 Adam Martowicz, Jakub Roemer, Paweł Zdziebko, Sławomir Kantor

09:20 – 09:40 **Structural modelling of a foil-gas bearing with use of the harmonic balance method to calculate its limit cycles**
Paper ID-24 René Groezinger, Michael Mayer, Sietze van Buuren, Bernhard Schweizer

09:40 – 10:00 **Experimental study of various low-friction coatings for use in a high-temperature foil bearing**
Paper ID-58 Paweł Bagiński, Grzegorz Żywica

10:00 – 10:20 **Dynamics of a rotor supported by active foil bearings – a numerical study**
Paper ID-63 Łukasz Breńkacz, Małgorzata Bogulicz

10:20 – 10:40 **Foil bearings tests in the Start-Stop cycle for various operational conditions**
Paper ID-16 Bartosz Moczulak, Wojciech Miąskowski

Session 8 – Identification and Diagnostics

11:00 – 12:20 Chairman: Jörg Wallaschek

11:00 – 11:20 **Model parameter estimation of ball bearings using generalized Polynomial Chaos Expansion**
Paper ID-20 Marcel S. Prem, Michael Klanner, Katrin Ellermann

11:20 – 11:40 **Experimental Tip-Timing analysis of bending-torsion rotor blades vibration in the plane of disc**
Paper ID-53 Romuald Rządkowski, Piotr Piechowski, Paweł Troka, Leszek Kubitz, Mirosław Kowalski

11:40 – 12:00 **Analysis of control methods for the jet engine rotor with magnetic bearings**
Paper ID-38 Paulina Kurnyta-Mazurek, Tomasz Szolc, Maciej Henzel, Krzysztof Falkowski

12:00 – 12:20 **Detection of wear damage by measuring the strains in ball-constant-velocity joints under operation conditions**
Paper ID-48 Andreas Zörnig, Christian Daniel, Hendrik Schmidt, Elmar Woschke

Session 9 – Turbomachines & Electrical Machines

13:20 – 14:40 Chairman: Robert Liebich

13:20 – 13:40 **Determining the influence of casing vibrational behaviour on rotordynamics**
Paper ID-21 Mona Amer, Martin Paehr, Lars Panning-von Scheidt, Joerg Seume, Joachim Schmied

13:40 – 14:00 **Reduced modal model of bladed turbine wheel for study of suppression of dangerous self-excited vibration by dry-friction contacts**
Paper ID-23 Luděk Pešek, Pavel Šnábl, Chandra Shekhar Prasad

14:00 – 14:20 **A reduced order numerical method for subsonic stall flutter analysis of steam turbine blade cascade**
Paper ID-25 Chandra Shekhar Prasad, Pavel Snabl, Luděk Pešek

14:20 – 14:40 **Digital twin of induction motors for torsional analysis of powertrains**
Paper ID-43 Timo P. Holopainen

Conference Closure and Announcement of SIRM 2023

15:00 – 15:30 Chairmen: Tomasz Szolc and Grzegorz Żywica