

ADMISSION TO DOCTORAL STUDIES

Session September 2024

Field of doctoral studies:

Doctoral supervisor:

TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

TOPIC 1: <i>Contributions on ultrasonic horns optimisation</i>
<p>Contents / Main aspects to be considered - <i>to be adapted/ completed/ deleted</i></p> <ul style="list-style-type: none"> • Design of mechanical ultrasonic concentrators (horns) based on bonding conditions and optimization criteria • Simulation of CMU behaviour with FEM • Optimized CMU testing
<p>Recommended bibliography:</p> <ol style="list-style-type: none"> 1. Roşca I.C., ; Pop M.I., Creţu N - Experimental and numerical study on an ultrasonic horn with shape designed with an optimization algorithm, APPLIED ACOUSTICS, Volume: 95, Pages: 60-69, DOI: 10.1016/j.apacoust.2015.02.009 2. Creţu, N., Delsanto P.P., Niţă, G., Roşca C., Scalerandi M., Sturzu I - Ultrasonic pulse propagation in inhomogeneous one-dimensional media, JOURNAL OF THE ACOUSTICAL SOCIETY OF AMERICA, Volume: 104, Issue: 1, Pages: 57-63, DOI: 10.1121/1.423283 3. Roşca C., Chiriacescu T.S., Creţu, N. - Ultrasonic horns optimization, INTERNATIONAL CONGRESS ON ULTRASONICS, PROCEEDINGS, Physics Procedia, Volume: 3, Issue: 1, Pages: 1033-1040, DOI: 10.1016/j.phpro.2010.01.13 <p>Roşca I.C. – Concentratori mecanici de ultrasunete, Editura Universităţii Transilvania din Braşov, 2002</p>
Prerequisites / Remarks: <i>to be adapted/ completed/ deleted</i>
<input type="checkbox"/> Scientific Doctorate (full-time only) <input checked="" type="checkbox"/> Professional Doctorate – in the fields of Music and Science of sport and physical education (full-time or part-time)
<input type="checkbox"/> without tuition fee (state budget funded) <input type="checkbox"/> with tuition fee or with funding from other sources than the state budget

Doctoral supervisor,
Prof.dr.ing. Ioan Călin ROŞCA

Coordinator of the field of doctoral studies,
Prof.dr.ing.mat. Sorin Vlase

TOPIC 2: *Researches on the analysis of noises and vibrations of rolling bearings with ceramic*

balls

Contents / Main aspects to be considered - *to be adapted/ completed/ deleted*

- Description of bearing kinematics and dynamics;
- Acoustic and vibratory analysis and diagnosis of ceramic ball bearings;
- Modal analysis and realization of a model of ceramic ball bearings
- Ceramic ball bearing testing.

Recommended bibliography:

1. Gafițanu M., Năstase D., Crețu S.P., Olaru D. (1985): Rulmenți. Proiectarea și tehnologie. Editura Tehnică, București;
2. Chiriacescu S. T., Balcu I., *Introducere în teoria elasticității și rezistența materialelor*, Editura Universității Transilvania din Brașov, 2008, ISBN 978-973-598-244-7;
3. Popa Alexandru Constantin V., Cerbu Camelia, *Introducere în Metoda Elementelor Finite*, Editura Universității Transilvania din Brașov, 2013, ISBN 978-606-19-0332-0, 562 pagini;
4. Roșca I. C., *Vibrații mecanice*, Editura Infomarket Brasov, ISBN 973-8204-24-0;
5. Roșca I. C., *Vibrații mecanice. Concepte și aplicații*, Editura Universității „Tranilvania” din Brașov, 2015 (ISBN 978-606-19-0690-1);
6. Singiresu S. Rao - The Finite Element Method in Engineering 5th Edition, ISBN-13: 978-1856176613, ISBN-10: 1856176614
7. X.T. Bai, Y.H. Wu, I.C. Rosca, K. Zhang, H.T. Shi - Investigation on the effects of the ball diameter difference in the sound radiation of full ceramic bearings, Journal of Sound and Vibration, 450 (2019), 231-250
8. Yuhou Wu, Haipeng Yan, Songhua Li, Ke Zhang, Lixiu Zhang - Calculation on the radiation noise of ceramic ball bearings based on dynamic model considering nonlinear contact stiffness and damping, Journal of Sound and Vibration, 479 (2020), 231-250
9. Shchurova, E. I. - Modeling of the Ceramics Structure for the Finite Element Analysis, International Conference on Industrial Engineering, ICIE 2016, Procedia Engineering 150 (2016) 179 – 184
Huaitao Shi, Zimeng Liu, Xiaotian Bai, Yupeng Li and Yuhou Wu - A Theoretical Model with the Effect of Cracks in the Local Spalling of Full Ceramic Ball Bearings, Appl. Sci. 2019, 9, 4142; doi:10.3390/app9194142

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