

STUDENTS' ANNUAL ACTIVITY REPORT CYCLE 34 YEAR 2

- Name and Surname **Ghasem GHANNAD TEHRANI**
- Dottorato in **INGEGNERIA MECCANICA**
- Department **DIMEAS**
- Coordinator **Prof. Luca GOGLIO**
- Tutors **Prof. Teresa BERRUTI**
Prof. Chiara GASTALDI
- Macroarea

Rotor dynamic response under Parametric Excitation: Application to the case of rolling bearings

- Short description of research activity (maximum 20 lines)

The Parametric Excitation (PE) is known as an internally generated excitation (time – variant parameter) that can lead to instability in rotating machines. During the rotation of a shaft supported by rolling bearing elements a loading zone would be formed where the number of the balls changes in the course of rotation. This phenomena is known as “varying compliance”. Because of this, the total stiffness of the bearing changes in time and results in PE within the rotor system.

During the past academic year, a lot of effort has been put on investigating the application of harmonic balance method (HBM) to analyze the Stability, Natural Frequencies and Frequency Response of a Jeffcott rotor model in presence of (PE) where promising results were obtained.

The achievements of this study has been published at “International journal of nonlinear mechanics (ELSEVIER)” and “journal of computational and nonlinear dynamics (ASME)” and also presented at “Turbomachinery Technical Conference & Exposition (Turbo Expo, 2020)” and “ Conference on Noise and Vibration Engineering (ISMA, 2020)”.

- Training activities carried out during the year (courses, seminars, etc.); for each activity specify the nature, duration, and location

Soft Skill Course

- Communication II (5 hours)
- Italian language, level II

Conferences

- Turbomachinery Technical Conference & Exposition (Turbo Expo), Virtual conference, 21 – 25 September 2020, as presenter
- Conference on Noise and Vibration Engineering (ISMA), Virtual conference, 7 – 9 September 2020, as presenter

- Possible participation in further research activities during the year (research projects and agreements)
-

- Possible participation in internal activities to support teaching during the year (specify on which courses, named as “subject expert”)
-

- Stays at other research institutions during the year
-

- Collaborations with companies during the year

-
- List of accepted papers

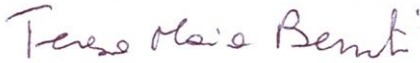
Journal Papers

- Ghasem Ghannad Tehrani, Chiara Gastaldi, and Teresa M. Berruti, "Stability analysis of a parametrically excited ball bearing system," *Int. J. Non. Linear. Mech.*, 120, pp. 103350 – 103360, 2019
- Ghasem Ghannad Tehrani, Chiara Gastaldi, and Teresa M. Berruti, "Trained Harmonic Balance Method for parametrically excited Jeffcott rotor analysis", *Journal of Computational and Nonlinear Dynamics*, 2020, (accepted, last version submitted)

Conference Papers

- Ghasem Ghannad Tehrani, Chiara Gastaldi, and Teresa M. Berruti, "Rolling bearing parametric excitation of a Jeffcott rotor system", *Turbo Expo, Proceedings of the ASME Turbo Expo*, GT2020-16148, 2020
- Ghasem Ghannad Tehrani, Chiara Gastaldi, and Teresa M. Berruti, "Parametrically induced Jeffcott rotor due to varying stiffness of the supporting rolling bearing element", *Proceeding of ISMA conference*, 2020

Date, 18/092020



Signature of Tutor



Signature of the PhD student

The Coordinator
