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MPhil scholarship in Mechanical Engineering

Applications for a MPhil scholarship are invited from interested and qualified candidates:

Research Topic: Development of a mathematical model of a circular force transducer with uniform stress distribution

Duration of Studentship: 2 years

Nature of support available:

This project is funded by the Ministry of Higher Education, (MOHE), Malaysia under the Fundamental Research Grant Scheme (FRGS). Thus, a full scholarship is available for this project, which include full tuition fee waiver, a monthly stipend of RM 2,100.00 for 2 years.

Project summary:

Circular force transducers play a vital role in applications like material testing, electronic weighing balance, may act as dynamometers, weighing of aircrafts, thrust measurement of jet and rocket engines, monitoring cutting forces in different machining operations etc. In these kinds of applications repetitive accurate reading from the transducer is desired. In case of material testing, frequent calibration of testing machine need to be maintained in order to obtain reliable testing results. A portable precision elastic circular device known as proving ring is generally used for this purpose. Though the proving ring has been used for many decades, its sensitivity to the applied load is measured by costly vibrating reeds. Furthermore, these conventional circular transducers have non-uniform stress distributions. The aim of this project is to develop a mathematical model of a ring shaped portable precision force transducer with uniform stress distribution. Castigliano's thorem and evolutionary shape optimization will be used to develop and validate the model of circular force transducer having continuously variable cross-sectional area. In terms of material cost, significant amount of materials can be saved for such type of devices. Moreover, given all similar conditions,



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the sensitivity will be increased significantly compared to a conventional circular force transducer thus eliminating the need of expensive vibrating reed mechanism.

Eligibility:

1. Bachelor's degree in Mechanical Engineering with CGPA 3.0 and above.
2. Fundamental understanding of stress analysis by finite element method.
3. Working knowledge of FE code ABAQUS and design software such as SOLIDWORKS.
2. Good communication skills and able to interact well with other people.
3. Fluent in written and spoken English.
4. Proactive and able to carry out research independently.
5. Strong reporting and documentation skills.
6. Pleasant personality, hardworking, independent, self-motivated.
7. Malaysian nationality.

Interested candidates should contact:

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