

# Impact Research Laboratory

The Impact Research Laboratory (IRL) was established in 2005. The IRL is placed in the [Mechanical Engineering Department](#) at [Iran University of Science and Technology](#). Dr. Hosseini Hashemi is the director of the IRL. Current research activities in the IRL can be grouped into three categories, each of which is briefly described as follows:

1. Low-velocity impact response of different bodies such as plates, shells and membranes is investigated. Analytical and numerical models based on small-time increment method are developed to solve the nonlinear equations of impact. Then, the impact force and the displacement of the bodies are calculated during low-speed impact.
2. Plates and shells with different sizes, shapes, thickness variations and boundary conditions are one of the key components in aerospace, civil, automotive, optical, electronic, mechanical, and shipbuilding industries. They may also be supported by an elastic foundation and exposed to external loads. Static and dynamic behaviors of above-mentioned bodies are studied to achieve a good understanding of their buckling, normal and shear stresses, deflection and natural frequencies in the design stage.
3. The knowledge of acoustical radiation behavior of plates and shells is very important to the engineers and designers. Therefore, the sound pressures, frequencies and critical distances for plates and shells are investigated for different shape and boundary conditions.

## Selected Publications

- ✚ Hosseini Hashemi Sh., Khorshidi K. and Rokni Damavandi Taher H. (2008) "Exact acoustical analysis of vibrating rectangular plates with two opposite edges simply supported via Mindlin plate theory", *Journal of Sound and Vibration*, Accepted for publication.
- ✚ Akhavan H., Hosseini Hashemi Sh., Rokni Damavandi Taher H., Alibeigloo A. and Vahabi Sh. (2008) "Exact solutions for rectangular Mindlin plates under inplane loading resting on Pasternak elastic foundation. Part II: Frequency analysis", *Journal of Computational Materials Science*, Accepted for publication.
- ✚ Akhavan H., Hosseini Hashemi Sh., Rokni Damavandi Taher H., Alibeigloo A. and Vahabi Sh. (2008) "Exact solutions for rectangular Mindlin plates under inplane loading resting on Pasternak elastic foundation. Part I: Buckling analysis", *Journal of Computational Materials Science*, Accepted for publication.
- ✚ Hosseini Hashemi Sh., Rokni Damavandi Taher H. and Omidi M. (2008) "3-D Free Vibration Analysis of Annular Plates on Pasternak Elastic Foundation via p-Ritz Method", *Journal of Sound and Vibration*, Vol. 311, pp. 1114-1140.
- ✚ Hosseini Hashemi Sh., Omidi M. and Rokni Damavandi Taher H. (2008) "The validity range of CPT and Mindlin theory in comparison with 3-D vibrational

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analysis of thick circular plate on the elastic foundation", European Journal of Mechanics: A-Solids, Accepted for publication.

- ✚ Hosseini Hashemi Sh., Khorshidi K. and Amabili M. (2008) "Exact solution for linear buckling of rectangular Mindlin plates", Journal of Sound and Vibration, Vol. 315, PP. 318-342.
- ✚ Mofakhamia M.R., Hosseini Toudeshky H. and Hosseini Hashemi Sh. (2007) "Noise reduction evaluation of multi-layered viscoelastic infinite cylinder under acoustical wave excitation", Journal of Shock and Vibration, Accepted for publication.
- ✚ Mofakhamia M.R., Hosseini Toudeshky H. and Hosseini Hashemi Sh. (2006) "Finite cylinder vibrations with different end boundary conditions", Journal of Sound and Vibration, Vol. 297, pp. 293-314.
- ✚ Hosseini Hashemi Sh. and Arsanjani M. (2005) "Exact characteristic equations for some of classical boundary conditions of vibrating moderately thick rectangular plates", International Journal of Solids and Structures, Vol. 42, pp. 819-853.
- ✚ Hosseini Hashemi Sh. and Anderson J. S. (1988) "Orthogonality and Normalization of Torsional Modes of Vibration of Solid Elastic Spheres", Journal of Sound and Vibration, Vol. 121(3), pp. 511-524.

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