

Contact Mechanics of Slender Structures

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ABSTRACT

Computational contact mechanics is a topic of significant industrial and research interest due to its numerous applications. Applications include contact between a belt and pulley; automotive impacts, textile modelling and recently several biomedical problems. Life-critical applications, like biomedical problems, require a need for accurate modelling of contact within a framework of deformable bodies. Owing to the nonlinearity of contact, it is often treated as a simple boundary condition in many applications, but this assumption fails in the large deformation context of soft and slender structures. Further, when considering slender structures, they undergo in-plane and out-of-plane cross-sectional deformation that increase the complexity of beam-to-beam contact modelling, as compared to standard 3D contact approaches. This lecture will discuss two formulations of beam-to-beam contact, considering both rigid and deformable cross-sections between slender beam-like structures with two diverse applications, textile yarns and Achilles tendons.

ABOUT THE SPEAKER

Dr. Ajay B. Harish is a Lecturer / Tenured Assistant Professor in Engineering Simulation and Data Science at the School of Engineering, University of Manchester since 2022. His group (www.harishlab.com) has expertise in the development of numerical methods with a focus on contact mechanics, thin-structures and high-performance computing. His academic background includes Doctor of Engineering in Mechanical Engineering from Leibniz University Hannover (Germany); Masters in Aeronautics from California Institute of Technology (USA); B.Tech in Mechanical Engineering from NITK Surathkal (India). Recently, he also received the prestigious Ramanujan Fellowship from the Government of India in 2022. He has received the Russel R. Vought Fellowship in 2007-08, scholarship from Continental AG in 2011-15, was honoured with the Viktor-Rizkallah Award for best international researcher by the Leibniz Foundation in 2016, Best researcher in Mechanics by the Mechanics division of Leibniz Foundation in 2017, LUT Foundation scholarship in 2017 and 2019.



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