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Mechanics of Highly-Deformed Elastic Shells

ASHKAN VAZIRI, Northeastern University

Emergence of new technological applications, in addition to the constantly growing interest in biological materials has accentuated the importance of studying the mechanics of highly deformed shells. The key challenge is the intricate interplay of physics and geometry, which leads to a mechanical response much different from the response of solid objects. The quest to understand the underlying phenomena has spawned theoretical and experimental studies, which have helped in understanding the underlying mechanisms of deformation and response of shells. In this talk, I will discuss the mechanics of highly deformed elastic shells in several classical problems: indentation of elastic spherical caps by a flat rigid plate and a rigid sharp indenter and pure. These assays are used to highlight some of the key aspects of the mechanics of highly deformed elastic shells, while an overview of the current state-of-the-art and suggestions for future research on this subject will be also provided.