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Biological shapes, modal analysis, and visualization of motion

In this talk, we will discuss some of the shapes of biological creatures such as dinosaurs, camels, horses, etc., and compute and visualize their eigenfunctions of elastodynamics, which are often called normal modes of vibration of those elastic solids. We compute and visualize such modes by using LS-DYNA as our software platform, and try to interpret their significance in terms of the reality of the lives of these animals. Furthermore, we try to incorporate those modes together with the (artistic rendering) software package Blender to visualize the motions of those animals. We hope that our work can help understand the interplay between shapes, mechanics/dynamics, and biological behaviors.