

PHYSICAL MATHEMATICS SEMINAR

Frustrating Geometry: Elastic Theory of Non-Euclidean Plates

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ABSTRACT:

Natural growth processes tend to result in bodies which possess no stress free configuration. We formulate a hyper-elastic theory for such bodies in which strain is measured with respect to a reference metric rather than a reference configuration. In this formulation, the residual stress arises from the geometrical frustration involved in the attempted isometric embedding of the non-Euclidean 3D metric in Euclidean space. Applying this formalism to thin sheets, we derive a reduced 2D elastic theory enabling us to treat thin bodies which are neither plates nor shells, which we term non-Euclidean plates.

In this talk I will present some of the phenomena exhibited by non-Euclidean plates such as, spontaneous buckling and convergence to a specific isometry in the limit of vanishing thickness. I will also discuss natural occurrences as well as synthetic gel realizations of non Euclidean plates.

TUESDAY, SEPTEMBER 15, 2009

2:30 PM

Building 2, Room 105

*Refreshments at 3:30 PM in Building 2, Room 290
(Math Department - Common Room)*



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