1116-65-1275   **Soeren Bartels** and **Andrea Bonito*** (`bonito@math.tamu.edu`), Texas A&M University, Department of Mathematics, 3368 TAMU, College Station, TX 77845, and **Ricardo H Nochetto**. *Finite Element Approximations of Bilayer Plates.*

The bending of bilayer plates is a mechanism which allows for large deformations via small externally induced lattice mismatches of the underlying materials.

We discuss its mathematical modeling, which consists of a nonlinear fourth order problem with a pointwise isometry constraint. We devise a finite element discretization based on Kirchhoff quadrilaterals and prove its Gamma-convergence. We propose a gradient flow based iterative method that decreases the energy and study its convergence to stationary configurations. We explore its performance, as well as reduced model capabilities, via several insightful numerical experiments involving large (geometrically nonlinear) deformations.

If time permits, we discuss its application to drug delivery, which requires replacing the gradient flow relaxation by a physical flow. (Received September 18, 2015)