1011-93-370 **Mary Ann Horn*** (horn@math.vanderbilt.edu), Department of Mathematics, 1326 Stevenson Center, Nashville, TN 37240. *An Overview of Modelling Challenges for a Nonlinear Plate-Beam Model.*

Controllability and stability properties of linked structures composed of multiple elastic elements give rise to an abundance of mathematical challenges. When a structure is composed of a number of interconnected elastic elements, the behavior becomes much harder to both predict and to control. While it may be known that a single element is exactly controllable with an appropriate choice of boundary feedback, a connected system composed of the same types of elements may not even be approximately controllable due to issues arising as energy is transmitted across the joints. Yet flexible structures consisting of a combination of strings, beams, plates and shells arise in many applications, including but not limited to trusses, robot arms, solar panels and suspension bridges.

A model comprised of a nonlinear von Krámán plate coupled with a nonlinear beam equation is developed from first principles. Dynamic junction conditions are imposed at the interface. The compatibility constraints at the junction give rise to mathematical challenges not seen in earlier work on the individual plate and beam models. (Joint work with Guenter Leugering.) (Received August 30, 2005)