

Nonsmooth Problems with Applications in Mechanics  
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## Numerical Simulations of a Spring-Rods System with Unilateral Constraints

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**Abstract:** We introduce a model which describes the equilibrium of two elastic rods attached to a nonlinear spring. During the talk, we derive the variational formulation and present the existence of a unique solution to the problem. Next, we consider the constrained problem in which the spring acts rigidly in compression or extension and examine the convergence of the solution of the relaxed version of this problem. We present the numerical simulations of the model in different settings. Finally, we show the numerical validation of the convergence result obtained for the penalized problem.

This model can be applicable when analyzing similar systems that may be present in real-world mechanical structures. Furthermore, the motivation to study such systems can be to make the first step to research problems in a more complex, three-dimensional setting. This is a joint work with Anna Ochal, Mircea Sofonea, and Domingo A. Tarzia.