

**EXISTENCE, UNIQUENESS AND DISCRETE-EXPONENTIAL
STABILITY FOR A VIBRATING AND DISSIPATIVE BEAM SYSTEM**

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ABSTRACT. The work of this paper consists to present analytical and numerical results on the weak solution for a vibrating beam system. Using the variational method, we show that the weak solution exists, is unique and is continuous in time. Moreover, by combining the finite element method and the one we call “discrete multiplier method”, we develop a numerical method stable and convergent which preserves faithfully the dissipativity of energy and the property of exponential stability obtained in the continuous case by the authors in [2]. We perform numerical simulations in order to validate this method.

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