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Dynamic cable simulation using a damped Cosserat rod model with measured stiffness and damping parameters

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Slender flexible parts like cables and hoses are important for the functionality of complex mechatronic machinery like cars or trucks [1]. Semi-discrete Cosserat rod models, obtained by combining ideas from the discrete differential geometry of framed curves [2] with the variational framework of Lagrangian mechanics [3], are a suitable choice to perform physically correct simulations of large spatial deformations of such structures.

This contribution provides an update of our recent work [4] to determine the effective parameters of the Kelvin-Voigt model utilized in our semi-discrete Cosserat rod model by means of measurements with specially devised experimental set-ups and model based parameter identification methods. In particular, we focus on effective bending and torsional stiffnesses and the related effective viscous damping parameters.

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