Full probabilistic analysis of a stochastic embebbed beam

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Abstract

In this contribution, we deal with the probablistic analysis of the deflection, and other quantities of interest, as the bending moment and shear force, of a embebbed beam based on Euler-Bernoulli's theory. We will consider that all parameters of our model (the moment of inertia and the Young's modulus) are independent random variables. Furthermore, the load acting vertically over the beam is assumed to be described by the Brownian Bridge process. The aim of this work is to obtain the main material properties using probabilsitic techniques. The theoretical findings will be illustrated with numerical simulations.

References

[1] Soong, T., Random Differential Equations in Science and Engineering. New York, Academic Press, 1973.

[2] Öchsner, A., Classical Beam Theories of Structural Mechanics. Springer, 2021.

[3] Cortés, JC., López-Navarro, E., Romero, JV., Roselló, MD. Probabilistic analysis of a cantilever beam subjected to random loads via probability density functions. *Comp. Appl. Math.* 42, 42, 2023. https://doi.org/10.1007/s40314-023-02194-0

[4] Malkiel, N., Rabinovitch, O., Elishakoff, I. Exact solutions for stochastic Bernoulli–Euler beams under deterministic loading. *Acta Mechanica* 232(6), 2201–2224, 2021.

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