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Adjustment of Parameters in the Finite Element Method for a Euler - Bernoulli Beam

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Abstract: The finite element method owes its progress in research to technological development, however there are still problems to solve, especially in relation to the uncertainty and variation in design parameters, these include external forces, material's properties, geometric properties, etc.
The model of finite element mesh becomes a random field, each node in the random field corresponds to a random variable or a random vector, it is estimated the average and variance for the first and second order moments and establishing the correlation function whereby full covariance matrix and calculate the coefficients of variation which establishes a quantification of the variation in the variables.
In the case of this work a finite element analysis was conducted on a beam in cantilever Euler Bernoulli, discrete by 11 elements of which two to nine nodes have critical points caused by two drillings. Additional adjustment to parameters were made and then contrasts with the results of an adjustment of parameters with Bayesian approach, for which it is estimated the MAC (modal assurance criterion) was conducted. The materials variations were also considered.

Keywords: Finite element, square error, MAC.