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E-Bike FE Model Analysis: Connection Stiffness of Elements with Different DOFs

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Abstract : Finite Element (FE) model of simplified e-bike structure was generated by main frame with two tiers, which consisted of pipe, mass, beam, and shell elements (pipe 289, beam188, shell 181, shell 281, combin14, link11, mass21). These elements would be introduced and demonstrated using mathematical formulas. Based on coupling theory, constrain equations was proposed. Exporting all the parameters obtained from theory part, the connection stiffness matrix of the whole e-bike structure between each of these elements was detected.

Keywords : coupling theory, stiffness matrix, e-bike, finite element model
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