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## Estimation and measurement of effective line mobility on a non-deterministic thin plate excited by a piezoelectric patch (Article) [\(Open Access\)](#)

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### Abstract

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This paper derived the expression to estimate the effective line moment mobility of a non-deterministic thin plate under moment excitation by a piezoelectric patch actuator. The piezoelectric patch actuator is assumed to generate purely line moments at each of its edges and regarded as a finite number of point moments acting on an infinite plate, which is achieved by integration method. The theoretical model is validated using MATLAB simulation and compared with experimental measurements on a randomized thin plate. The derived effective line moment mobility managed to closely estimate high-frequency response while cutting significant computational time and resource. Results from this study can be used in many applications ranging from vibration isolation where power transmission between the isolator with an area distribution and its host structure can be determined more accurately, and to design the optimal shunt circuit of a piezoelectric shunt damper for maximum power dissipation in order to reduce vibration of a non-deterministic thin plate. © 2020 Azni N. Wahid, et al.

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### Indexed keywords

Engineering controlled terms: Actuators Carrier mobility Frequency response MATLAB Piezoelectric devices Piezoelectric materials Piezoelectricity Plates (structural components) Vibration control

Engineering uncontrolled terms: Computational time High frequency response Integration method Matlab simulations Piezoelectric patch Piezoelectric patch actuators Theoretical modeling Vibration isolations

Engineering main heading: Vibrations (mechanical)

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