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Piezoelectric based Passive Vibration Control of Composite Turbine Blade using Shunt Circuit

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Abstract : Turbine blades are subjected to a variety of loads, lead to an undesirable vibration. Such vibration can cause serious damages or even lead to a total failure of the blade. The present paper addresses the vibration control of turbine blade. The study aims to propose a passive vibration control using piezoelectric material. the passive control is effectuated by shunting an RL circuit to the piezoelectric patch in a parallel configuration. To this end, a Finite element model for the blade with the piezoelectric patch is implemented in ANSYS APDL. The model is then subjected to a harmonic frequency-based analysis for the case of control on and off. The results show that the proposed methodology was able to reduce blade vibration by 18%.

Keywords : blade, active piezoelectric vibration control, finite element., shunt circuit
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