DSTA 2021
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16th INTERNATIONAL CONFERENCE
Dynamical Systems – Theory and Applications
December 6-9, 2021, On-line

Numerical modelling of the experimental based high frequency subsonic stall flutter in linear blade cascade

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Abstract: Stall flutter in large steam turbine blades is one of the major challenge in the operation safety of turbomachinery. Stall flutter triggers due to complete or partial separation of flow from the blade surfaces when the angles of attack are relatively high, especially in low pressure stages. For the design and development of modern turbomachines prediction of subsonic stall flutter is essential. Numerical simulations are preferred over physical model for stall flutter analysis to save both time and cost. This paper deals with the numerical modelling of the five blade cascade with different flow variables to analyse subsonic stall flutter. Furthermore, in this numerical study various factors dominating the stall flutter phenomenon will be carried out in detail. The numerically estimated stability parameters will be validated against the experimental data obtained from five blade cascade experimental model.

Keywords: Subsonic stall flutter, low pressure, steam turbines, cascade, turbomachines.