World Academy of Science, Engineering and Technology
International Journal of Aerospace and Mechanical Engineering
Vol:8, No:12, 2014

Optimal Trailing Edge Flap Positions of Helicopter Rotor for Various Thrust Coefficient to Solidity (Ct/σ) Ratios

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Abstract : This study aims to determine change in optimal lo-cations of dual trailing-edge flaps for various thrust coefficient to solidity (Ct /σ) ratios of helicopter to achieve minimum hub vibration levels, with low penalty in terms of required trailing-edge flap control power. Polynomial response functions are used to approximate hub vibration and flap power objective functions. Single objective and multi-objective optimization is carried with the objective of minimizing hub vibration and flap power. The optimization results shows that the inboard flap location at low Ct/σ ratio move farther from the baseline value and at high Ct/σ ratio move towards the root of the blade for minimizing hub vibration.

Keywords : helicopter rotor, trailing-edge flap, thrust coefficient to solidity (Ct /σ) ratio, optimization
Conference Title : ICAH 2014 : International Conference on Aerodynamics and Hydrodynamics
Conference Location : Bangkok, Thailand
Conference Dates : December 24-25, 2014