عنوان مقاله:
Rotor Sizing of Helicopters Using Statistical Approach

محل انتشار:
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خلاصه مقاله:
This paper is concerned with the statistical model development issues, necessary for rapid estimation of the rotor sizing for single main rotor helicopters at the preliminary design stage. However, Central Composite Design (CCD) method, simulation-based data collection, linear regression analysis, mathematical modelsdevelopmentand validations through the analysis of variance (ANOVA) were performed as central themes in this approach. The CCD enforced the use of replicated central points and some star points, added to the basic factorial design space, required for constructing the test plan matrix. This matrixwas used to developed mathematical models in the form of quadratic polynomials (second-order), that represented the physical size of rotor as functions of the helicopter gross weight, maximum forward flight speed, main and tail rotor blade number and their interactions.The validations were examined by ANOVA and comparing against data for a general single rotor configuration. Using this approach, improvements in physical sizing of both main and tail rotor of the single rotor were obtained using minimum number of data, provided by CCD test plan.The obtained results of this work support the ongoing researches for the development of rapid .prototyping, especially, main and tail rotor sizing of helicopters

کلمات کلیدی: