LIMIT CYCLE PIO ANALYSIS with SIMULTANEOUSLY ACTING MULTIPLE ASYMMETRIC SATURATION

by

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(ABSTRACT)

Pilot in-the-loop oscillation (PIO) is a phenomenon which occurs due to the dynamic interaction between pilot and aircraft. This detrimental aircraft handling quality appears through a variety of flight conditions and is very difficult to predict. Due to this complex behavior, PIO is not easily eliminated. This report describes a method of PIO analysis that is capable of examining multiple asymmetric nonlinearities acting simultaneously. PIO analyses are performed on a model based on the USAF NT-33A variable stability aircraft with nonlinearities including stick position limiting, elevator deflection limiting, and elevator rate limiting. These analyses involve the use of dual input describing functions which enable the prediction of frequency, amplitude, and mean point of oscillation.

FOREWORD

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