Analysis of the AN/FQM-117B

Ainsmar X. Brown
U.S. Army Research Laboratory
Aberdeen Proving Ground, MD

Cadet Addison W. Bohannon
United States Military Academy
West Point, New York

ABSTRACT:

The AN/FQM-117B, an unmanned aircraft developed to test new flight technology is analyzed for stability using classical automatic control theory. A treatment of second order differential equations, flight stability modes, and classical control theory is discussed before application of the theory for the stated problem. Root locus plots are used to determine the stability of each mode, short period, long period, roll, and Dutch roll dynamics. Once all modes have been proven stable, it is concluded that the aircraft is in fact capable of performing its desired purpose. The parameters are then altered to reflect a theoretical rudder, and the process is repeated yielding stable results.

KEYWORDS: Unmanned Aerial Vehicle, Classical Control Theory, Linearization

CONTACT: Ainsmar X. Brown, U.S. Army Research Laboratory, AMSRD-ARL-VT-UV-CONT, Aberdeen Proving Grounds, MD, Tel: (410) 278-7024, Email: ainsmar.brown@arl.army.mil

CDT Addison W. Bohannon, United States Military Academy, West Point, NY, Tel: (845) 515-1611, Email: addison.bohannon@usma.edu