1017-35-21 **Marianna Shubov*** (marianna.shubov@euclid.unh.edu), 33 College Road, Kingsbury Hall, Durham, NH 03824. *Asymptotic and Spectral Analysis of Aircraft Wing Model in Subsonic Airflow. Applications to Flutter Control.*

Asymptotic and spectral results for a long slender aircraft wing model in a subsonic inviscid airflow will be presented. The model is governed by a system of two coupled integro-differential equations. The differential part governs the ground vibrations of the wing, i.e., vibrations in the absence of surrounding airflow. The integral part models forces and moments exerted on the wing by the airflow. The system is supplied with a two-parameter family of boundary conditions modeling action of self-straining actuators. The initial boundary value problem is reduced to a single evolution-convolution operator equation in the state space. Spectral analysis of this equation is reduced to investigation of the distribution of the poles and structure of the residues in these poles of the generalized resolvent operator. Its poles are called aeroelasic modes and the residues at these poles describe the mode shapes. 1) Asymptotic formulas for the aeroelastic modes and the mode shapes and Riesz basis property of the mode shapes will be presented. 2) Existence of a finite number of unstable aeroelasic modes responsible for flutter development and flutter control will also be discussed. (Received January 11, 2006)