

Prevention of Flutter:

We have previously seen that flutter can be prevented by eliminating inertial, aerodynamic and elastic coupling by arranging for the centre of gravity, the centre of independence and the flexural axis of the wing section to coincide. The means by which this may be achieved are indicated in the coupling terms.

The inertial coupling term is $m_{gy} + m_{ij}$ in which m_{ij} is usually very much smaller than m_{gy} . Thus, inertial coupling may be virtually eliminated by adjusting the position of the centre of gravity of the wing section through mass balancing so that it coincides with the flexural axis i.e. $gc = 0$. The aerodynamic coupling term m_{yy} vanishes as we have seen when the centre of independence coincides with the flexural axis further, the terms $L_{v,y}$ and $L_{z,\alpha}$ are very small and may be neglected so that

$$(m - L_{ij}) \ddot{y} - L_{ij} \ddot{y} + (k - L_x) y - L_x \alpha = 0$$

$$(I_0 - M_x) \ddot{\alpha} - M_0 \alpha + (k_0 - M_x) \alpha = 0$$