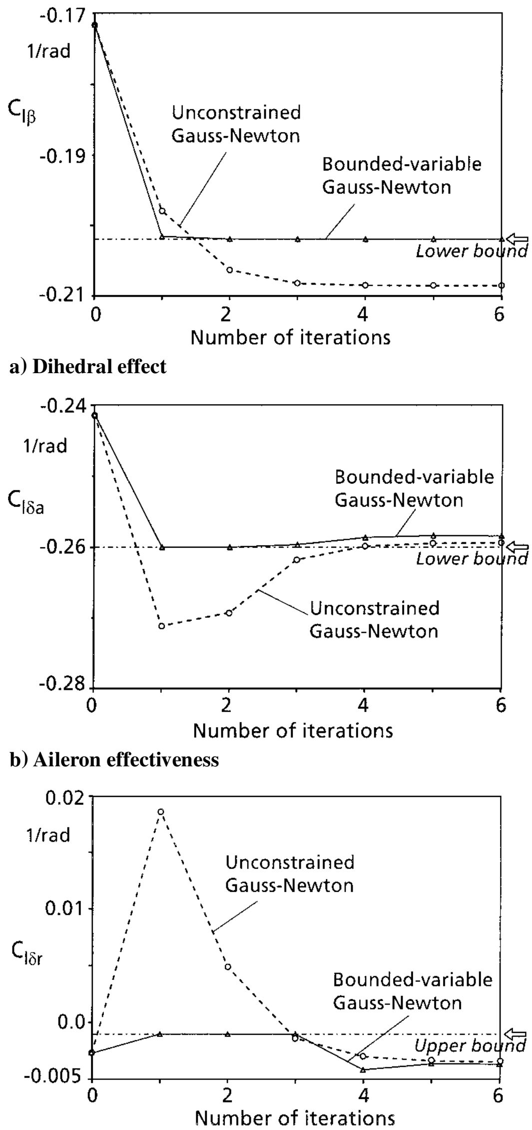

c) Rolling moment caused by rudder deflection

Fig. 1 Iterative estimates of typical rolling moment derivatives.

immediately by indications to leave the active set, can result, particularly as the minimum of the cost function is approached. The reason for this is twofold: 1) the roundoff errors becoming dominant, and the gradients computed using the numerical approximations are inaccurate; and 2) some variables are approximately linearly dependent. This phenomenon was, however, not encountered in several examples of estimating nonlinear aerodynamic parameters with various degrees of complexity.

Conclusion

The widely used Gauss–Newton method for aircraft parameter estimation in the time domain has been successfully extended to account for simple bounds on the variables. From an engineer's point of view and for implementation purposes, the active set strategy appears to be a simple, direct, and efficient approach. Additionally, the approach retains all of the advantages of the classical unconstrained Gauss–Newton at marginally larger computational overhead. The method extends, in general, the scope of aircraft parameter estimation by permitting the limitation of the variables to be estimated within a specified range. The performance of the bounded-variable Gauss–Newton method presented in this Note was demonstrated on a typical example of estimating the stability and control derivatives pertaining to the lateral-directional motion of an aircraft from flight data.

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Errata

Implications of the Insensitivity of Vortex Lift to Sweep

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EQUATION (6) should be:

$$Cp_v(x, y) = 1 - \left(4.63\tan^{1.2}\alpha\cos\alpha\left(\frac{2s}{b}\right) \times \cos^2\left\{\tan^{-1}\left(\frac{1}{z_v}\left(\frac{y}{s} - y_v\right)\right)\right\} \Big/ 2\pi z_v \tan^{0.2}\epsilon\right)^2$$

On page 532, the second sentence of the last paragraph should read: "This may be considered an upper (or rearward) bound as the wing sweep tends to 90 deg and the wing's trailing-edge extent tends to 0."