Errata

AIAA 82-4091

Symmetric Flow Characteristics of Thin Rectangular Wings

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[Journal of Aircraft, **18**, 1070-1071 (1981)]

IN the text immediately after Eq. (6) in the above paper there is a sentence with the unfortunate and incorrect statement, "The set of Eqs. (1-6) summarizes in a concise analytic form the knowledge that at present is obtained from linearized theory as to ...." The correct formulation is, "... in a concise analytic form most of the information that at present ...." It is so because at least one pioneering analytic result ought to be mentioned in the present situation. Lagerstrom and Graham[1] obtained by means of conical flow theory the following analytical result on slender rectangular wings for $M>1$,

$$K_p \equiv C_{N_\alpha} = \frac{4}{\pi B}\left[\left(2-\frac{1}{BA}\right)\sin^{-1}BA + (BA-2)\cosh^{-1}\frac{1}{BA} + \left(1+\frac{1}{BA}\right)\sqrt{1-(BA)^2}\right], \quad \tfrac{1}{2} \leqq BA \leqq 1 \qquad (1)$$

where $B=\sqrt{M^2-1}$ and A is the aspect ratio.

Later on Behrbohm[2] showed that the same result could be obtained as a special case when solving the problem of symmetric flow around trapezoidal wings of small aspect ratio by means of the method of source distribution.

That the two completely different theoretical approaches led to the same answer represented in itself a result of great interest.

Evaluation of Eq. (1) for a wing with $A=2$ and inserting the result in Fig. 2 gives, in the following figure, a more complete picture of $C_{N_\alpha} \equiv K_p$ vs Mach number, obtainable from analytical results deduced from linearized theory. The leading edge suction force coefficient $K_{v,\mathrm{le}}$ is zero and the side edge suction force coefficient $K_{v,\mathrm{se}}$ has not been determined.

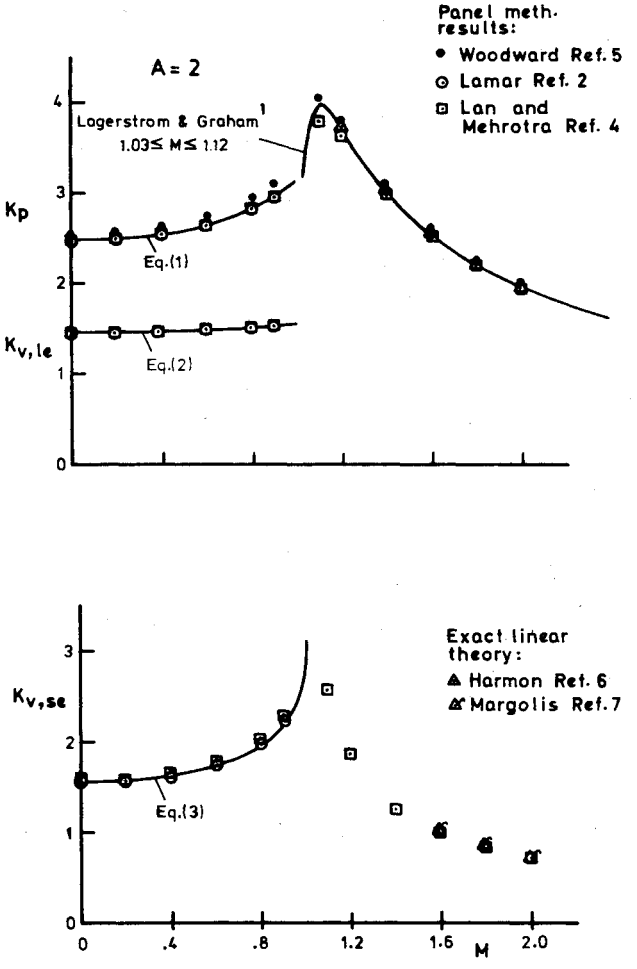

Fig. 2 (Completed Fig. 2 of the above paper.) The coefficients K_p, $K_{v,\mathrm{le}}$, and $K_{v,\mathrm{se}}$ vs Mach number obtained by different panel methods and by exact linear supersonic theory for a rectangular wing with aspect ratio $A=2$. The subsonic results are compared with the semiempirical expressions, Eqs. (1-3).

References

[1] Lagerstrom, P.A. and Graham, M.E., "Low Aspect Ratio Rectangular Wings in Supersonic Flow," Douglas Aircraft Co. Rept. SM 13110, 1947.

[2] Behrbohm, H., "The Lifting Trapezoidal Wing with Small Aspect Ratio at Supersonic Speed," SAAB Aircraft Co. Tech. Note 10, Linköping, Sweden, 1952.

Received Nov. 25, 1981.

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