

Reply by Authors to L.E. Ericsson

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IN reply to L.E. Ericsson's comment on our paper,¹ it is necessary to first point out that gasdynamic theory is accepted by most researchers as the foundation on which any rational approximate theory must be based. In this regard, we reiterate that there is *only one correct limiting value of gasdynamic theory* in the double limit as freestream Mach number $M_\infty \rightarrow \infty$ and the ratio of specific heats $\gamma \rightarrow 1$. The limiting value is the Newton-Busemann value and not the Newtonian impact value alone. These have been well established in numerous publications.²⁻⁷

The sharp cone value used as scaling factor by Dr. Ericsson is the Newtonian impact value alone and is thus not the correct limiting value of gasdynamic theory. Ericsson's result is properly represented in Fig. 4 of our paper as it is rescaled by the correct limiting value, i.e., the Newton-Busemann value. The fact that it was rescaled is clearly indicated in the text and in Fig. 4 of Ref. 1 and should not cause confusion with Fig. 5 of Ref. 8.

References

- ¹Tong, B.-G. and Hui, W.H., "Unsteady Embedded Newton-Busemann Flow Theory," *Journal of Spacecraft and Rockets*, Vol. 23, March-April 1986, pp. 129-135.
- ²Cole, J.D., "Newtonian Flow Theory for Slender Bodies," *Journal of the Aeronautical Sciences*, Vol. 24, June 1957, pp. 448-455.
- ³Hayes, W.D. and Probstein, R.F., *Hypersonic Flow Theory*, Vol. 1, Academic Press, Orlando, FL, 1966, Chap. 3.
- ⁴Mahood, G.E. and Hui, W.H., "Remarks on Unsteady Newtonian Flow Theory," *Aeronautical Quarterly*, Vol. 27, 1976, pp. 66-74.

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⁵Hui, W.H. and Tobak, M., "Unsteady Newton-Busemann Flow Theory, Part I: Airfoils," *AIAA Journal*, Vol. 19, March 1981, pp. 311-318.

⁶Hui, W.H. and Tobak, M., "Unsteady Newton-Busemann Flow Theory, Part II: Bodies of Revolution," *AIAA Journal*, Vol. 19, Oct. 1981, pp. 1272-1273; full paper available as NASA TM-80459.

⁷Hui, W.H. and Van Roessel, H.J., "Unsteady Newton-Busemann Flow Theory, Part IV: Three-Dimensional," *AIAA Journal*, Vol. 22, May 1984, pp. 577-578.

⁸Khalid, M. and East, R.A., "Stability Derivatives of Blunt Slender Cones at High Mach Numbers," *Aeronautical Quarterly*, Vol. 30, 1979, pp. 559-599.

Errata

Path-Constrained Rendezvous: Necessary and Sufficient Conditions

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EQUATIONS (2a-c) were printed incorrectly. They should read as follows:

$$\dot{x}_0(\tau) = \frac{x_0 \omega \sin(\theta) + y_0 \omega \{6\theta \sin(\theta) - 14[1 - \cos(\theta)]\}}{3\theta \sin(\theta) - 8[1 - \cos(\theta)]} \quad (2a)$$

$$\dot{y}_0(\tau) = \frac{2\omega x_0 [1 - \cos(\theta)] + y_0 \omega [4 \sin(\theta) - 3\theta \cos(\theta)]}{3\theta \sin(\theta) - 8[1 - \cos(\theta)]} \quad (2b)$$

$$\dot{z}_0(\tau) = \frac{-\omega z_0}{\tan(\theta)} \quad (2c)$$

where $\theta = \omega t$.