

Reply by Authors to M. J. Cohen

W. L. Chow*

University of Illinois at Urbana-Champaign,
Urbana, Ill.

and

S. K. Liu†

Battelle Laboratory, Columbus, Ohio

AS Professor Cohen pointed out, the problem of the ideal two-dimensional compressible gas jet issuing from a reservoir under pressure is important in the history of fluid dynamics. Since enunciation of the free streamline theory by Helmholtz, this problem has repeatedly provided the opportunity of testing ideals, concepts, and methods of solution for fluid dynamics problems. The authors exploited¹ this opportunity to establish the feasibility of performing numerical calculations in the hodograph plane. Naturally, the authors welcome the comment made by Cohen and wish to thank him for pointing out his previous work^{2,3} in this particular area.

The authors would like to mention that the endeavor of performing numerical calculations on the hodograph plane is indeed meritable. In some of the free surface flows with gravitational effect such as occurring in open-channel flows,^{4,5} it has been found that this type of problem can best be dealt with through numerical calculations in the hodograph variables. The velocity variation along the free streamline as a result of gravitational effect must be iteratively determined and this iterative process is rapidly convergent. Thus, numerical calculations in the hodograph plane have opened the way to study flow problems whose solutions have not been well established.

References

¹Liu, S. K. and Chow, W. L., "Numerical Solutions of the Compressible Hodograph Equation," *AIAA Journal*, Vol. 16, Feb. 1978, pp. 188-189.

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*Professor of Mechanical Engineering, Associate Fellow AIAA.

†Research Scientist.

²Cohen, M. J., "Two-Dimensional Gas Jets," *Journal of Applied Mechanics*, Vol. 27, Dec. 1960, pp. 603-608.

³Cohen, M. J., "A Hodograph Design Method for Compressible Flow Problems," *Journal of Applied Mechanics*, Vol. 29, Sept. 1962, pp. 533-548.

⁴Chow, W. L., Han, T., and Wu, C., "Hydrodynamics Solution for Incompressible Flow as Influenced by Gravitation," paper to be published by *AIAA Journal*.

⁵Chow, W. L. and Han, T., "Inviscid Solution for the Problem of Free Overfall," *Journal of Applied Mechanics*, to be published.

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