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Langley Research Center



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Computer Program to Determine Pressure Distributions and Forces on Blunt Bodies of Revolution

The problem:

A process was needed to obtain the surface pressures along meridian lines of blunt bodies of revolution.

The solution:

A computer program was written to include the integration of the surface pressures in order to obtain the axial-force, normal-force, and pitching-moment coefficients.

How it's done:

The program reads in the body geometry in terms of a spherical nose-cap radius and x,y coordinates starting at the point of tangency to the nose cap. The program then generates for the desired radial angles θ the equivalent bodies which represent the shape of the meridian lines of the body at the input angle of attack. The program represents the longitudinal shape of these bodies by straight-line elements between the transformed input coordinates. The spherical cap from the stagnation point to the tangency point is represented by 20 straight-line segments. After the equivalent bodies are obtained, the pressure distributions are computed and

integrated along the respective meridian lines of the input body to obtain the forces and moments. By selecting output options, the pressure and Mach number variations for each meridian line can be obtained with the forces and moments, or just the forces and moments can be output.

Notes:

1. This program was written in CDC FORTRAN (Run 2.3) for the CDC-6600 computer system.
2. Inquiries concerning this program should be directed to:

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