Water flowing over a hemisphere

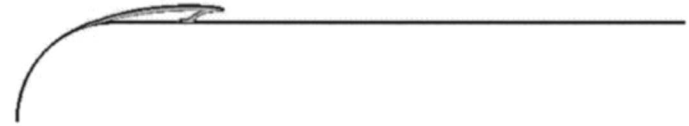
Before performing the cavitated flow body case, we define the cavitation number by

$$\mathrm{K} = \frac{P_0 - P_v}{1/2(\rho U_0^2)} = \frac{P_0 - P_v}{P_0 - P_\infty}$$

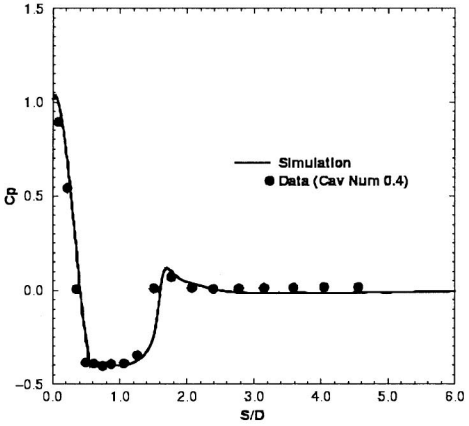
where $P_{0,}$ $P_{v,}$ P_∞ are total pressure, saturated-vapor pressure, and free-stream pressure respectively. Rouse and McNown experiments for water flowing over a hemisphere/cylinder geometry are presented. The Reynolds number per inch for this configuration is 1.363 million. Simulations for three cavitation numbers of 0.4, 0.3, and 0.2 are presented. Initial conditions are assumed for each case with temperature of 300 K, incoming uniform velocity of 4.317 m/s

Reference

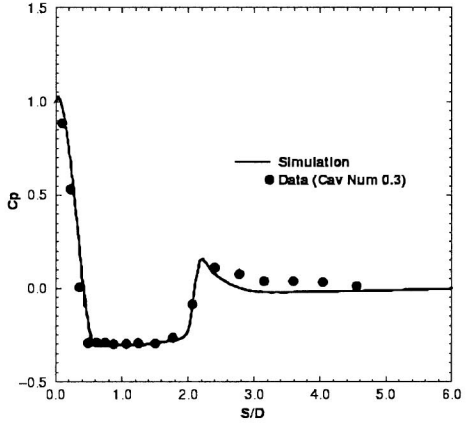
[1] Rouse, H., and McNown, J. S., "Cavitation and Pressure Distribution: Head Forms at Zero Angle of Yaw," State Univ. of Iowa Engineering Bulletin 32, Ames, IA, 1948.



Cavitation Number = 0.4.



Cavitation Number = 0.3.



Cavitation Number = 0.2.

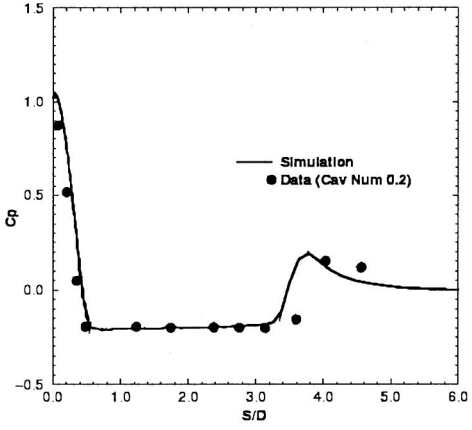


Fig. 5 Cavitation zone and surface pressure profiles at various cavitation numbers for hemisphere/cylinder headform