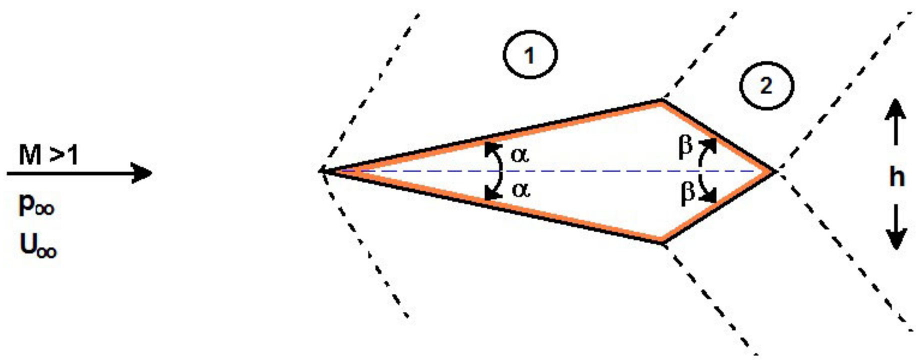
Solution to Problem 340A:

Using the theory for small angles of turn, behind the bow wave in region 1, the pressure is



$$\frac{p_1 - p_\infty}{p_\infty} = \frac{\gamma M^2}{(M^2-1)^{1/2}}\,\alpha \tag{1}$$

and behind the shoulder wave in region 2

$$\frac{p_2 - p_\infty}{p_\infty} = -\frac{\gamma M^2}{(M^2-1)^{1/2}}\,\beta \tag{2}$$

Then denoting the drag per unit depth normal to the sketch by D:

$$D = h(p_1 - p_2) \tag{3}$$

and the drag coefficient

$$C_D = \frac{2D}{\rho U_\infty^2 h} = \frac{2(p_1-p_2)}{\rho U_\infty^2} = \frac{2(\alpha+\beta)}{(M^2-1)^{1/2}} \tag{4}$$

If the wedge were turned around then

$$\frac{p_1 - p_\infty}{p_\infty} = \frac{\gamma M^2}{(M^2-1)^{1/2}}\,\beta \quad \text{and} \quad \frac{p_2 - p_\infty}{p_\infty} = -\frac{\gamma M^2}{(M^2-1)^{1/2}}\,\alpha \tag{5}$$

and C_D would be unchanged. Or you could realize that exchanging α and β is the expression for C_D would leave it unchanged.