Computational Fluid Dynamics (AE/ME 339)
MAE Dept.

Home Work Problem

For the nozzle shown in the figure use the following transformation to map it into a rectangular domain. The nozzle wall is represented by $y_{max} = x^2$ for $1 \le x \le 2$.

$$\xi = x, \eta = \frac{y}{y_{max}}$$

1. Determine numerical values of ξ_x, ξ_y, η_x, η_y at the point $\xi = 1.5$, $\eta = 0.5$,

   i) analytically
   ii) numerically using central differencing.

2. Calculate the Jacobian at the point in (1).

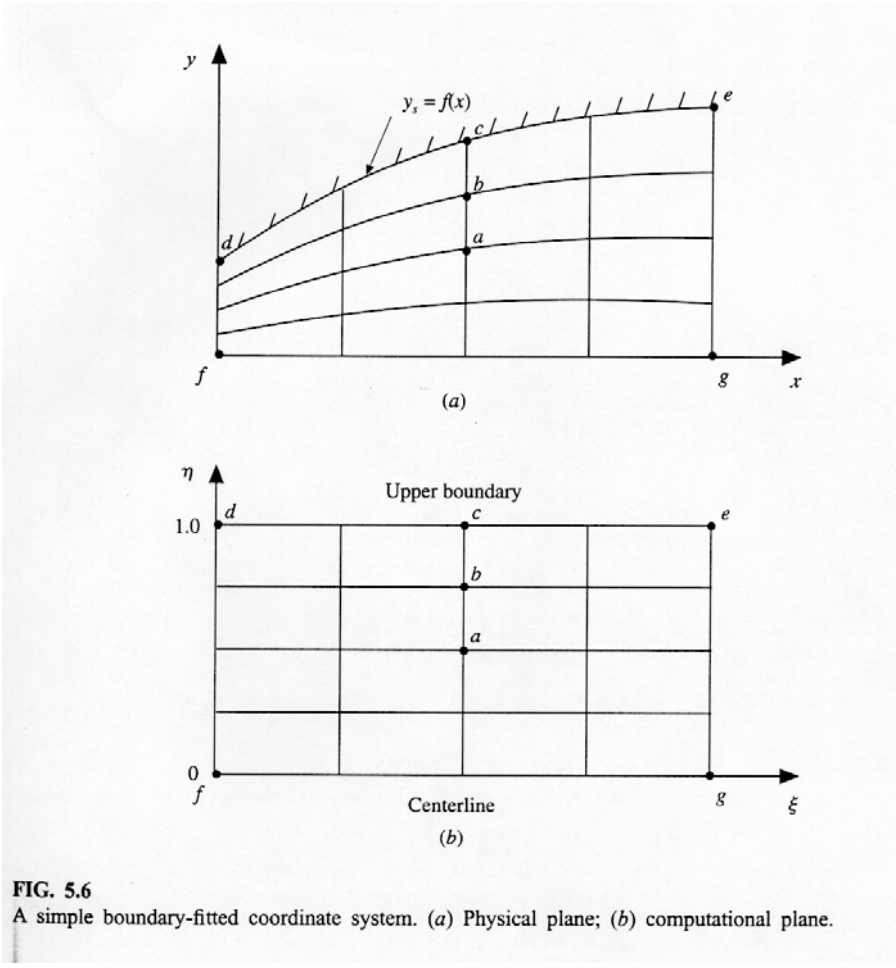

FIG. 5.6
A simple boundary-fitted coordinate system. (*a*) Physical plane; (*b*) computational plane.