Example 6A-C: Calculation of y^+

Example 6A - C.

6*A*. Suppose you are interested in knowing how thick the linear sublayer is (that is, let $y^+ \le 7$). Solve for *y* in this case:

$$y = \frac{y^+\nu}{u_*} \le \frac{7\nu}{u_*}.$$

6*B*. Suppose you want to know how big the node spacing ought to be if you want 3 equally-spaced computational nodes within $y^+ = 1$:

$$y = \frac{y^+\nu}{n_{nodes}u_*} = \frac{(1)\nu}{(3)u_*} = \frac{\nu}{3u_*}.$$

6*C*. What is the value of y^+ for a system with $u_* = 0.5$ m/s, $\nu = 3.1x10^{-6}$ m^2/s. Its *first* computational node is at y=1.0x10^{-3} m? Is this a good idea?

$$y^+ = \frac{yu_*}{\nu} = \frac{\left(1.0\text{x}10^{-3}\right)(0.5)}{3.1x10^{-6}} = 161.3 \text{ [-]}.$$

Not only no, but 7734 no! Despite having the first computational node at 1 milli-meter, the y^+ calculation shows that the first computational node is too far away from the viscous and buffer layers.