(a) Piezometric head gradient

\[ h_a(x) \]

\[ gA \frac{\partial \eta}{\partial x} \]

\[ z = 0 \]

Smooth (arbitrary) reference line \( S_R \)

(b) Residual head gradient from Piezometric gradient and arbitrary body force direction

\[ = \]

\[ h_a(x) \]

\[ gA \frac{\partial h_a}{\partial x} \]

\[ z = 0 \]

Body force in arbitrary direction

\[ gAS_R \]