[pex7] Electric potential near interface to poly-electrolyte gel II

(a) Take the potential $\psi_c(x)$ worked out in [pex8] via the superposition principle from the potential $\psi_l(x)$ worked out in [pex9] and substitute it into the linearized Poisson-Boltzmann equation from [pln68] to show that the associated distibution of bound charges is

$$n_b(x) = n_l\theta(-x).$$

(b) In [pex57] we have used a model potential $\psi_m(x) = c[1 - b\tanh(ax)]$ to describe the same situation. Find the optimized model parameters a, b, c in $\psi_m(x)$ that best represent the potential $\psi_c(x)$ found in [pex8]. Plot the two functions in the same graph using suitably scaled variables.

Solution: