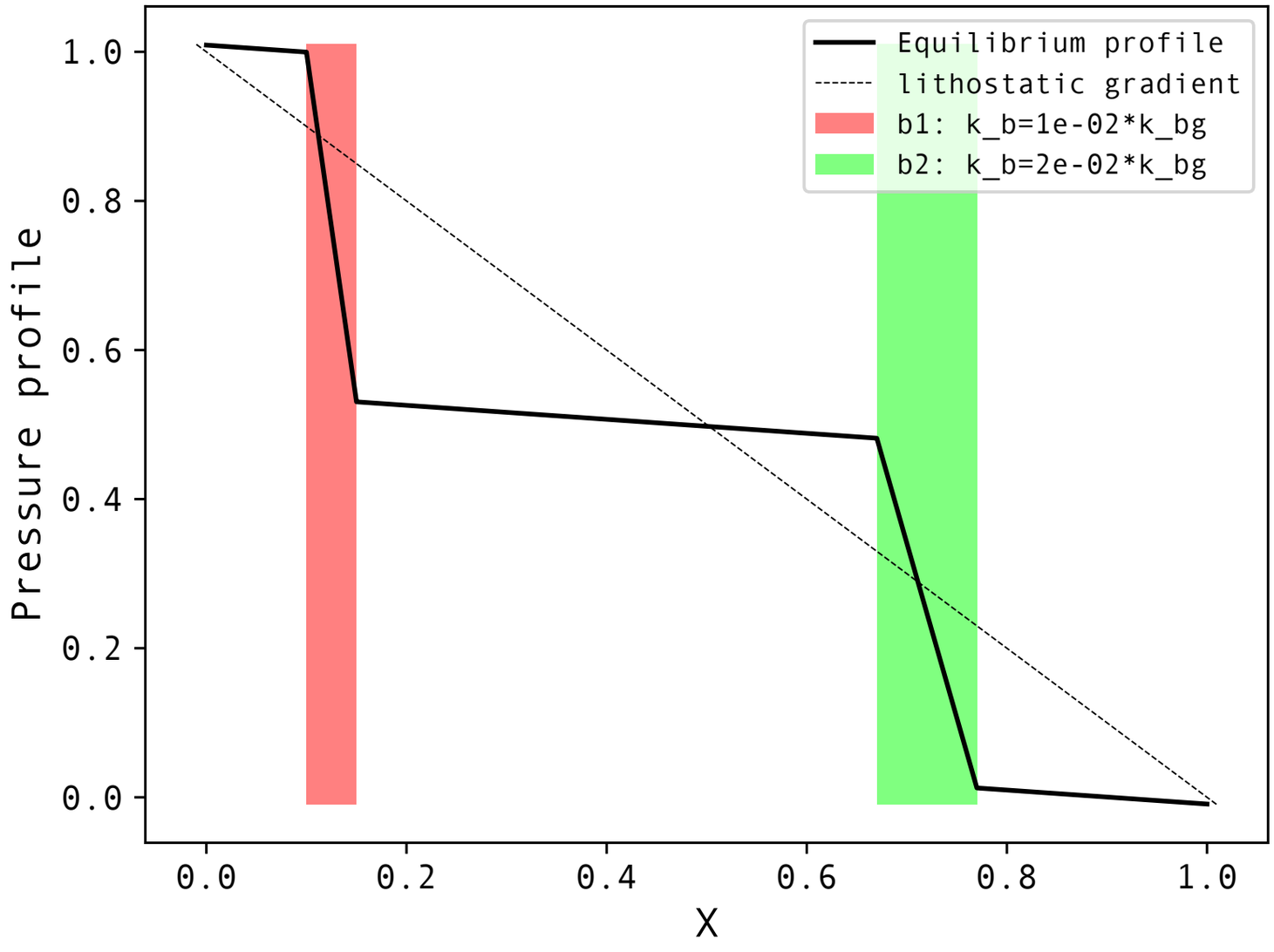
Around permanent regime

(a) PP boundaries: equilibrium

The differential of pressure imposed by the boundary conditions is distributed on barriers and background segments according to their width and permeability. If:

L_barriers/k_barriers >> L_background / k_background,

then, the total differential of pressure can be assumed to be mostly accommodated at barriers, likewise, the equilibrium flux is mostly dictated only by barriers length and permeability (cf Shapiro et al. 2018), similar derivation.



Around permanent regime

(a) PP boundaries: equilibrium

In the case where N barriers of width *w_b* and permeability *k_b* are prevalent in the permanent regime, the equilibrium flux *q* can be written as:

*q = dP_tot * k_b / mu / (N*w_b)*

and we can derive an equivalent permeability for the whole domain:

k_eff = k_b * L_domain / (N*w_b)

In the case of dynamic (opening/ closing) valves, effective *k_b* and *w_b* could be determined, and used in the previous formulas. Both would be linked to the period of loading and unloading of the valve. This remains to be derived.