Around permanent regime

(a) PP boundaries: transient from valve breaking

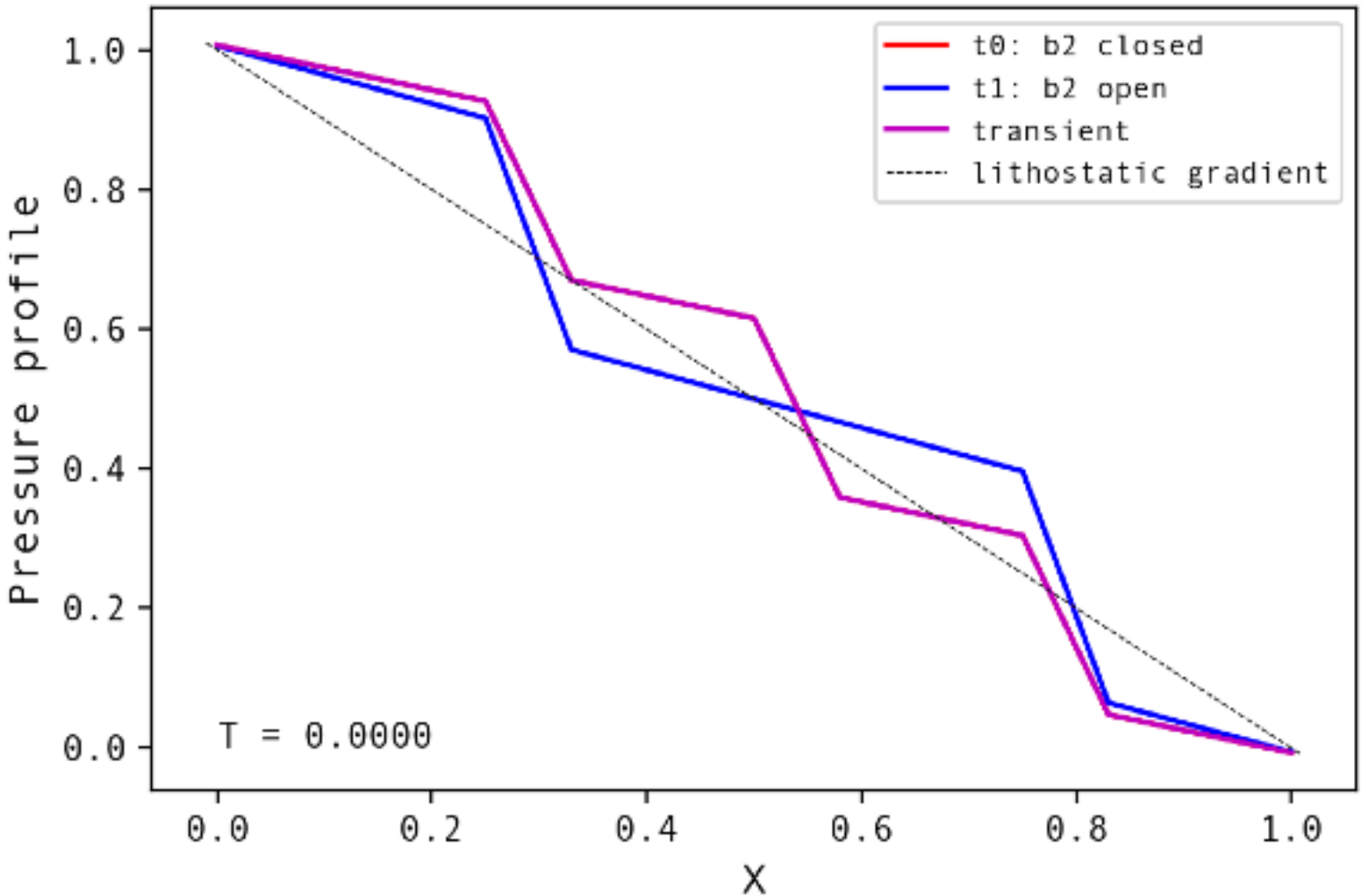
Experiment:

- Init. equilibrium pore-pressure profile when 3 valves are closed, but valve nb2 is open ($k_b = k_{bg}$).
- Observe the propagating transient

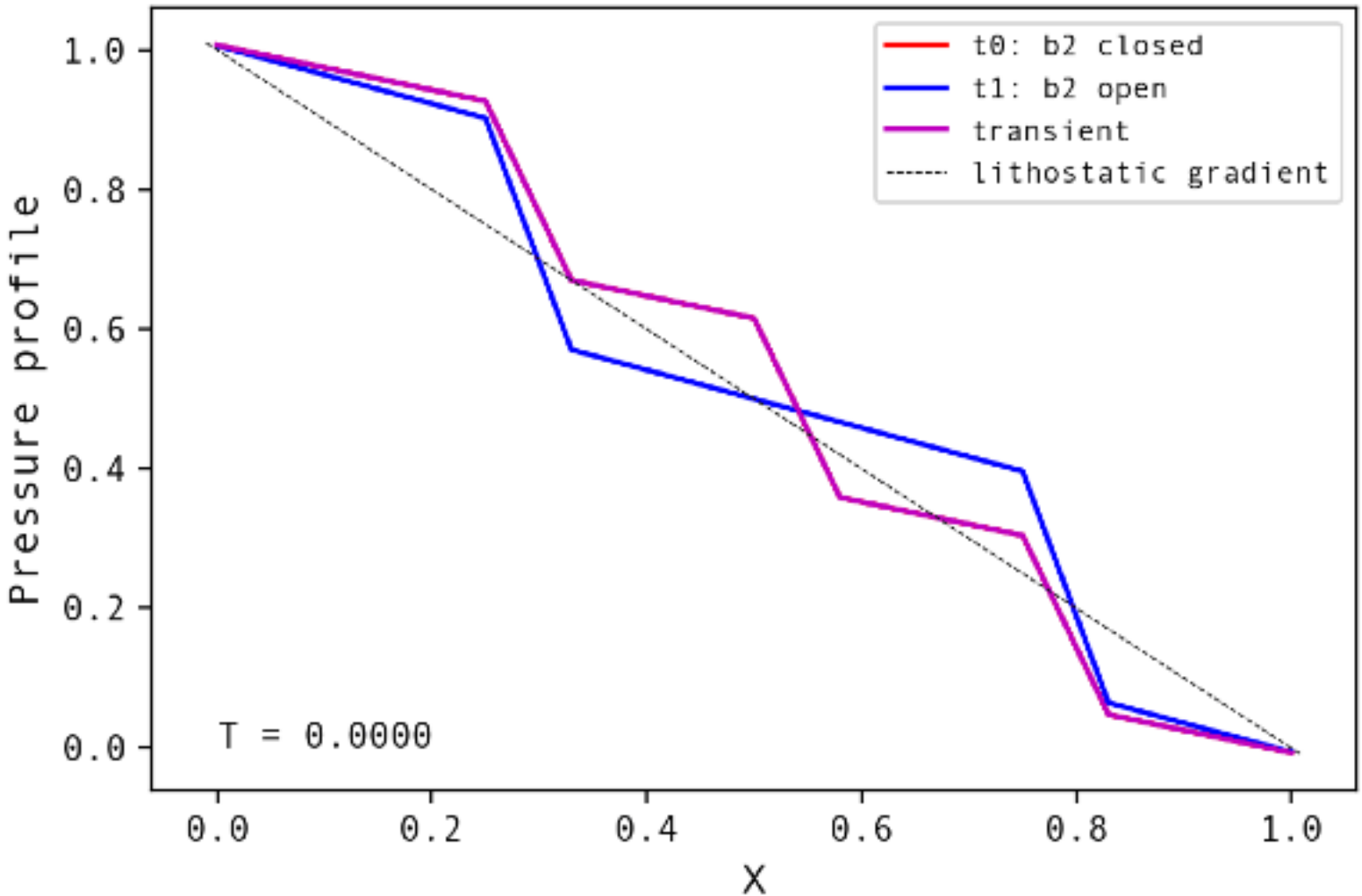
Observation:

- transient progresses from one valve to the others, to redistribute total dP on background segments and barriers.
- dP across remaining valves is increased (closer to failure?)
- overpressure (above lithostatic gradient) is decreased downdip and increased updip

Depending on opening conditions, their might be a directional effect on valve activation


t0: b2 closed
t1: b2 open
transient
lithostatic gradient
Pressure profile
X
T = 0.0000
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

↓ this is a gif, click on it to play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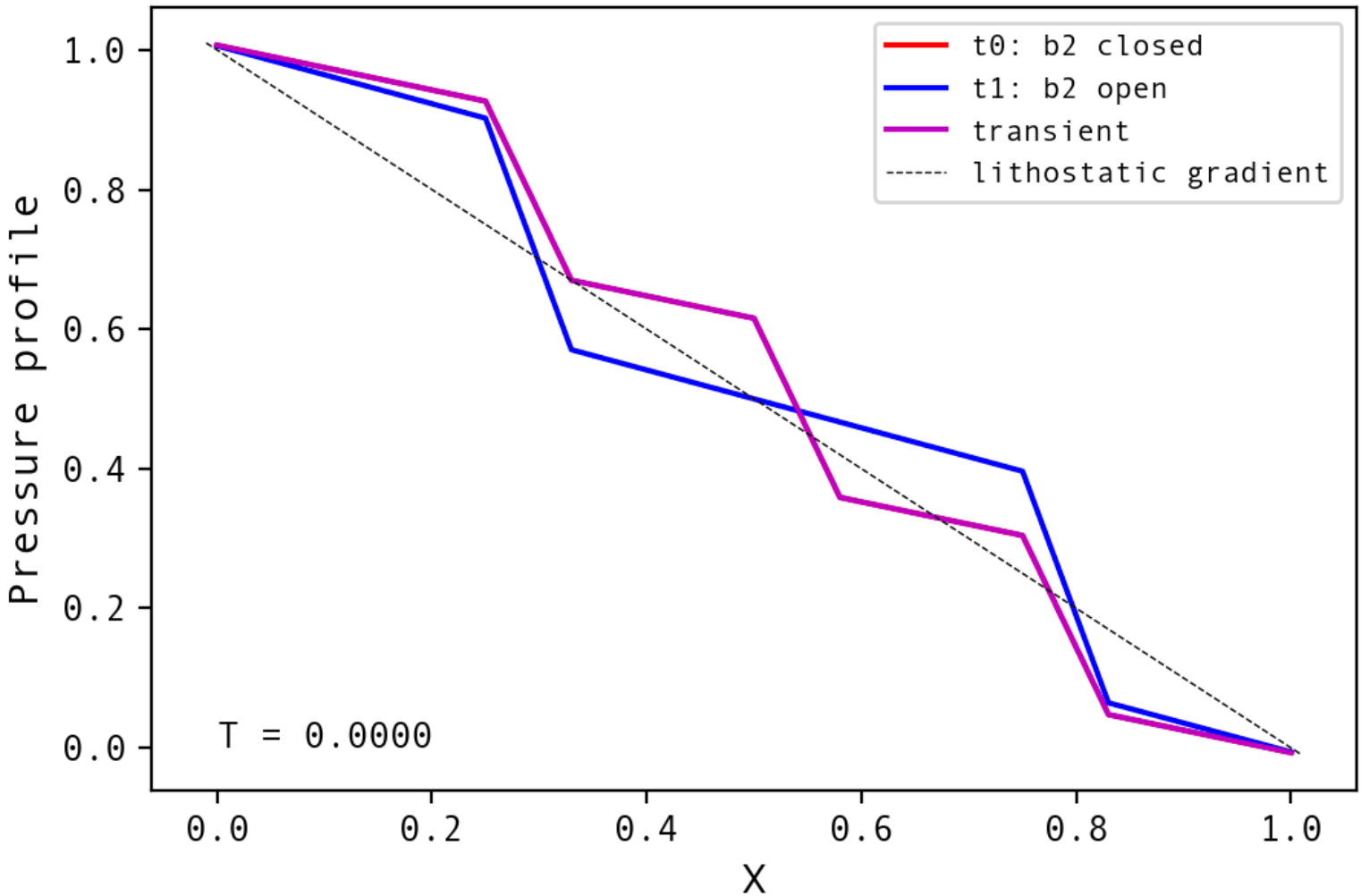
t0: b2 closed
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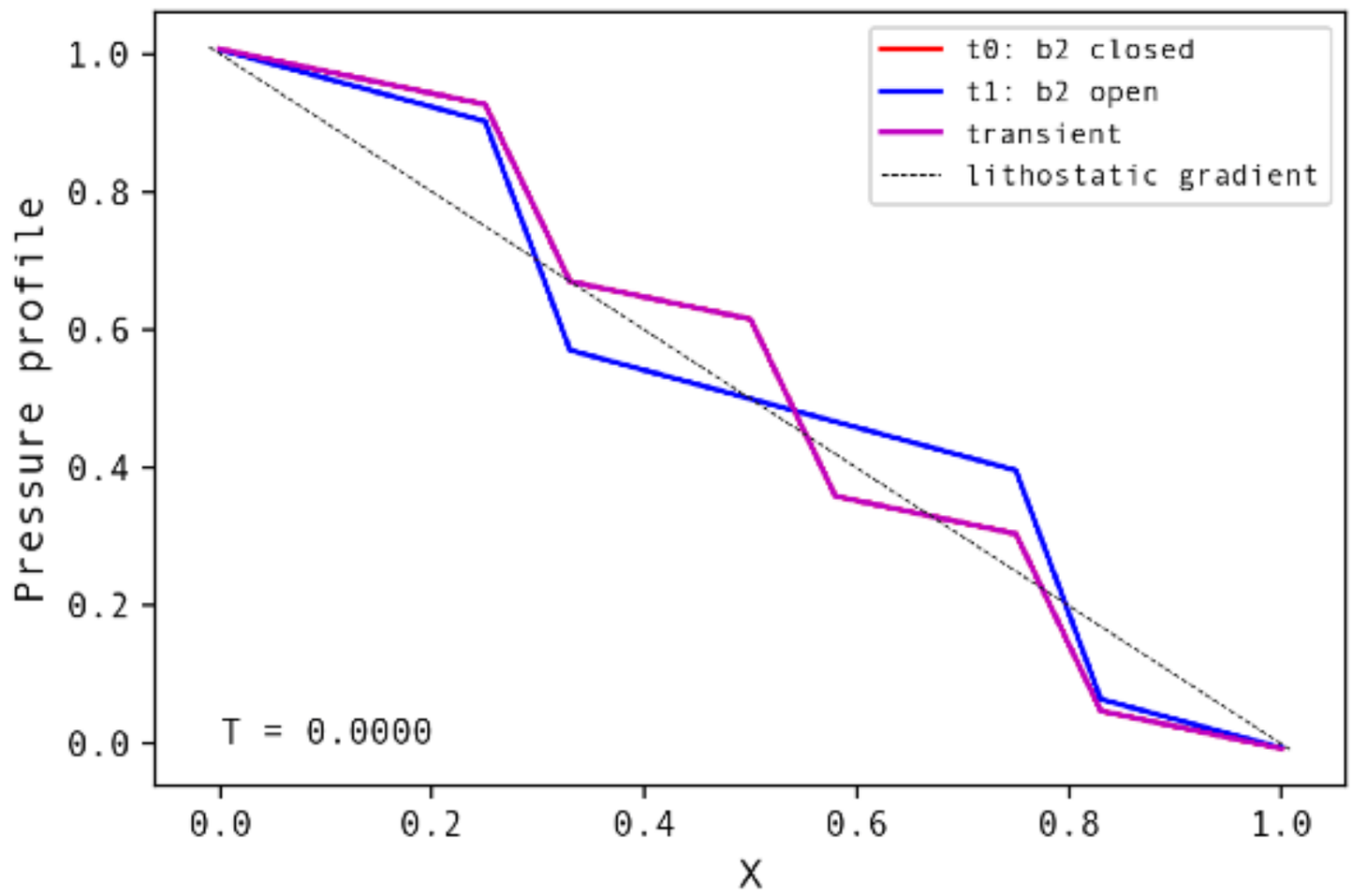

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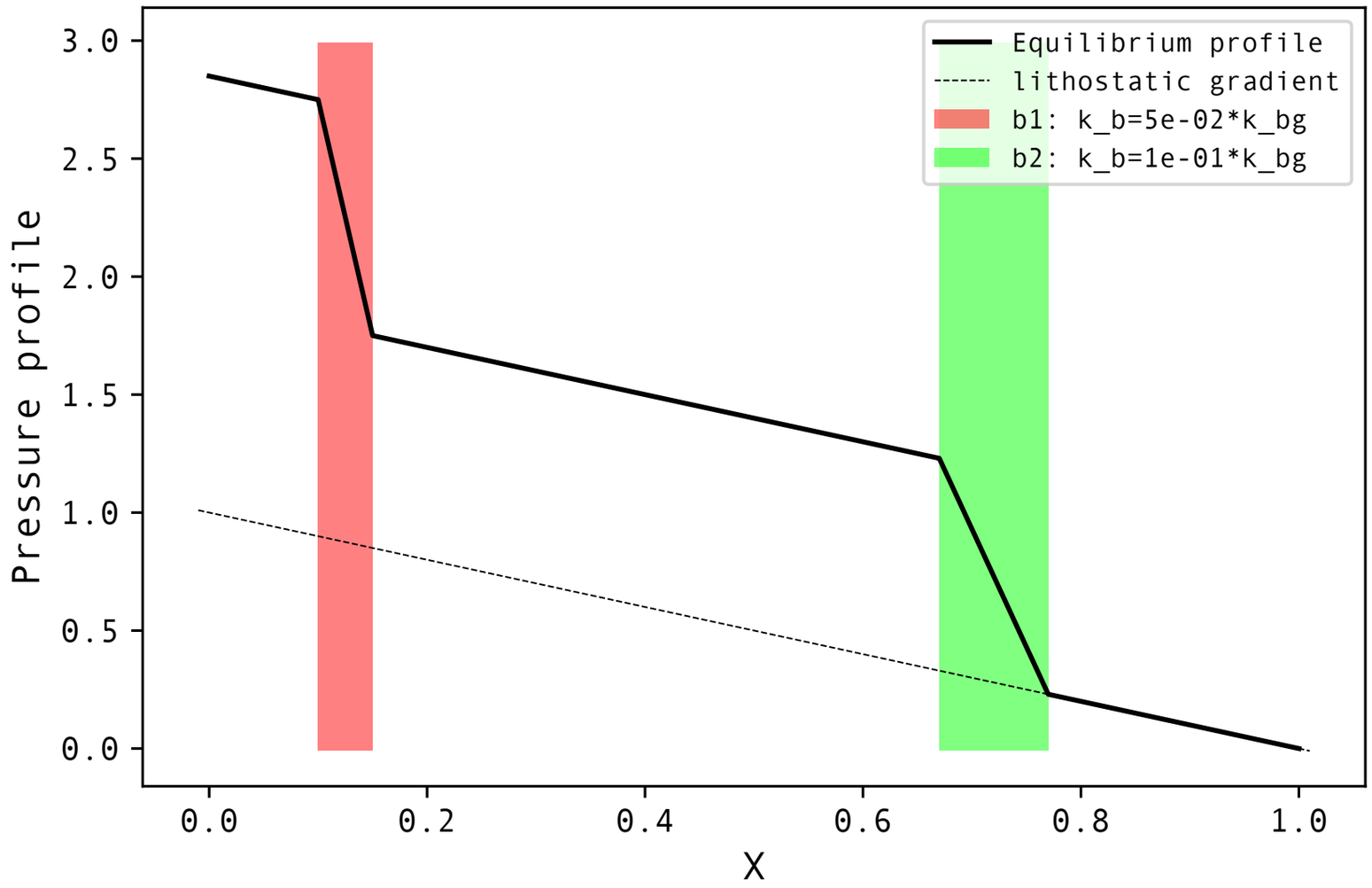
Around permanent regime

(b) QP boundaries: equilibrium



In permanent regime, the equilibrium flux is equal to the fixed flux entering the system. Once more, if the criterion:

L_barriers/k_barriers >> L_background / k_background,

is satisfied, effective permeability of the segment is mainly accounted by permeability of the barriers (most of pressure differential between domains ends is taken up on barriers). Illustration here shows a case where criterion is not satisfied.