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Supplement on CC1

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Community comment on "Hydrological concept formation inside long short-term memory (LSTM) networks" by Thomas Lees et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-566-CC2>, 2021

A kernel or impulse response function, $u[t]$, has typically a rising limb, a peak, and a falling limb.

At time step, $t-1$, the discharge $Q[t-1]$ had a corresponding $u[t-1]$. But at time step t , $Q[t]$ has two $u[t]$ values depending on the sign of $dQ=Q[t]-Q[t-1]$, i.e. whether the discharge is rising (+), falling (-), or steady (0). During the rising stage, $u[t]>u[t-1]$; the falling stage, $u[t]<u[t-1]$; and $u[t]=u[t-1]$, otherwise.

In the LSTM (long short-term memory) networks, one need know only $u[t-1]$ and $u[t]$, i.e. the short(est)-term memory, and not further apart.