Minimum gap

Maximum deceleration decM

Car ahead C1, speed v1t

My car CO, speed vOt

Current distance between C1 and CO: d1

Current time step is t

Next time step is t+1

Time needed for a car at speed v to stop from this moment in second: m = (ceiling) (1)

Distance needed for a car to stop from the current speed in meter:

dneed =

Consider for the next time step t+1:

In the worst case, C1 may brake, so min(v1t+1 ) = max( v1t – decM, 0)

If cars need to reduce speed to 0, after i time steps, C1 advances (v1t – i\*decM )with i is the number of seconds passed from the time t+1 when it started to brake, and CO advances (vOt+1 – i\*decM ). Hence the difference in distance at each time step is the difference in speed b/w two cars:

If : need reserved space for the worst case, reserved gap = m \* with m is the time CO needs to reduce speed to 0 from the speed (equation 1)

Else, we don’t need it, reserved gap = 0

So for the next time step t+1, the distance needed for CO is: distance to advance with speed + reserved gap with

min() =

max() =