Electronic supplementary materials

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A real-time adaptive signal control method for multi-intersections in mixed connected vehicle environments

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Algorithm S1: Method to determine SPaT

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Input: vehicles location $x_{i,j}^n$, speed $v_{i,j}^n$, real time t, preset phasing ϕ_i^k, lane length L_j, preset green start time $g_{i,j}^k$, preset red start time $r_{i,j}^k$, preset green time G_j', extended green time ΔG_j

Output: SPaT of intersection i in cycle T_i^k

for all phase j of intersection i do
  $\text{greenend}_{i,j}^k \leftarrow r_{i,j}^k - t$, $\text{num}_{i,j}^k \leftarrow 0$;
  for all vehicles in CVs range and will used $\phi_{i,j}^k$ do
    $\text{leftlength} \leftarrow L_j - x_{i,j}^n$;
    if $v_{i,j}^n \times \text{greenend}_{i,j}^k \geq \text{leftlength}$ then
      $\text{num}_{i,j}^k \leftarrow \text{num}_{i,j}^k + 1$;
    end
  end
end
for all phase j of intersection i do
  if $\text{num}_{i,j}^k \neq 0$ then
    $\phi_{i,j}^k \leftarrow 1$;
  else
    $\phi_{i,j}^k \leftarrow 0$;
  end
end
for all phase j, $\phi_{i,j}^k \neq 0$ do
  $\text{greenend}_{i,j}^k \leftarrow t + t_{\text{pre}} + \sum_{m=1}^{j}\left(\phi_{i,m}^k G_m\right)$, $\text{num}_{i,j}^k \leftarrow 0$;
  repeat (3–16)
end

21 for all phase j, $\phi_{i,j}^{k} \neq 0$ do

22 $\text{greenend}_{i,j}^{k} \leftarrow \text{greenend}_{i,j}^{k} + \Delta G_j + \sum_{m=1}^{j-1}(g_m G_m)$, $\text{num}_{i,j} \leftarrow \text{num}_{i,j}^{k}$; $\text{num}_{i,j}^{k} \leftarrow 0$;

23 repeat (3–8)

24 if $\text{num}_{i,j}^{k} > \text{num}_{i,j}$ then

25 $G_j \leftarrow G_j' + \Delta G_j$, $g_j \leftarrow 1$;

26 else

27 $g_j \leftarrow 0$;

28 end

29 end

30 Return ϕ_i^k, G_j