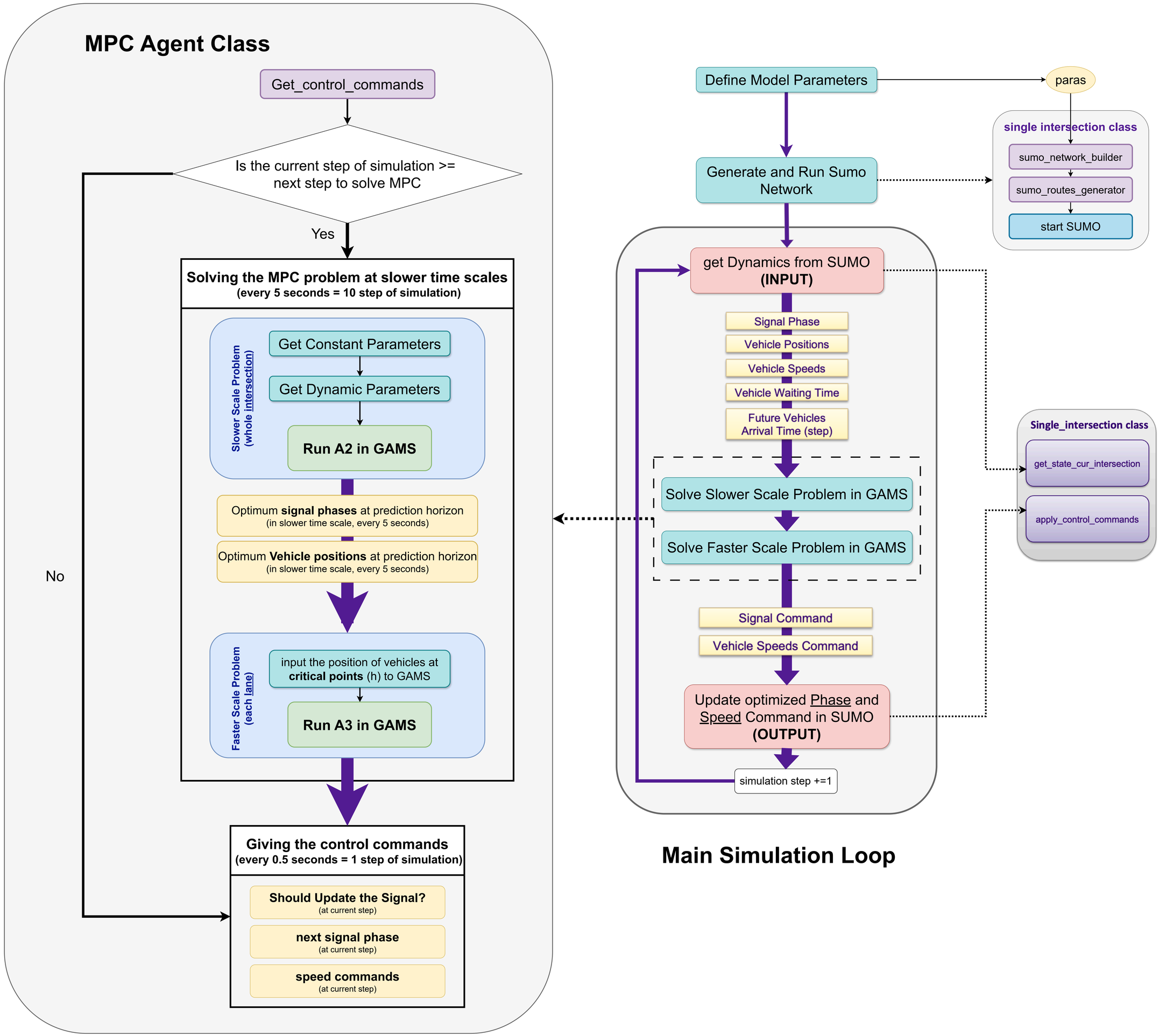
MPC Agent Class
Get_control_commands
Is the current step of simulation >= next step to solve MPC
Yes
No
Solving the MPC problem at slower time scales
(every 5 seconds = 10 step of simulation)
Slower Scale Problem (whole intersection)
Get Constant Parameters
Get Dynamic Parameters
Run A2 in GAMS
Optimum signal phases at prediction horizon (in slower time scale, every 5 seconds)
Optimum Vehicle positions at prediction horizon (in slower time scale, every 5 seconds)
Faster Scale Problem (each lane)
input the position of vehicles at critical points (h) to GAMS
Run A3 in GAMS
Giving the control commands
(every 0.5 seconds = 1 step of simulation)
Should Update the Signal?
(at current step)
next signal phase
(at current step)
speed commands
(at current step)
Define Model Parameters
paras
single intersection class
sumo_network_builder
sumo_routes_generator
start SUMO
Generate and Run Sumo Network
get Dynamics from SUMO (INPUT)
Signal Phase
Vehicle Positions
Vehicle Speeds
Vehicle Waiting Time
Future Vehicles Arrival Time (step)
Solve Slower Scale Problem in GAMS
Solve Faster Scale Problem in GAMS
Signal Command
Vehicle Speeds Command
Update optimized Phase and Speed Command in SUMO (OUTPUT)
simulation step +=1
Single_intersection class
get_state_cur_intersection
apply_control_commands
Main Simulation Loop