電気情報工学基礎演習B

Control a Mobile Robot: Lecture 6

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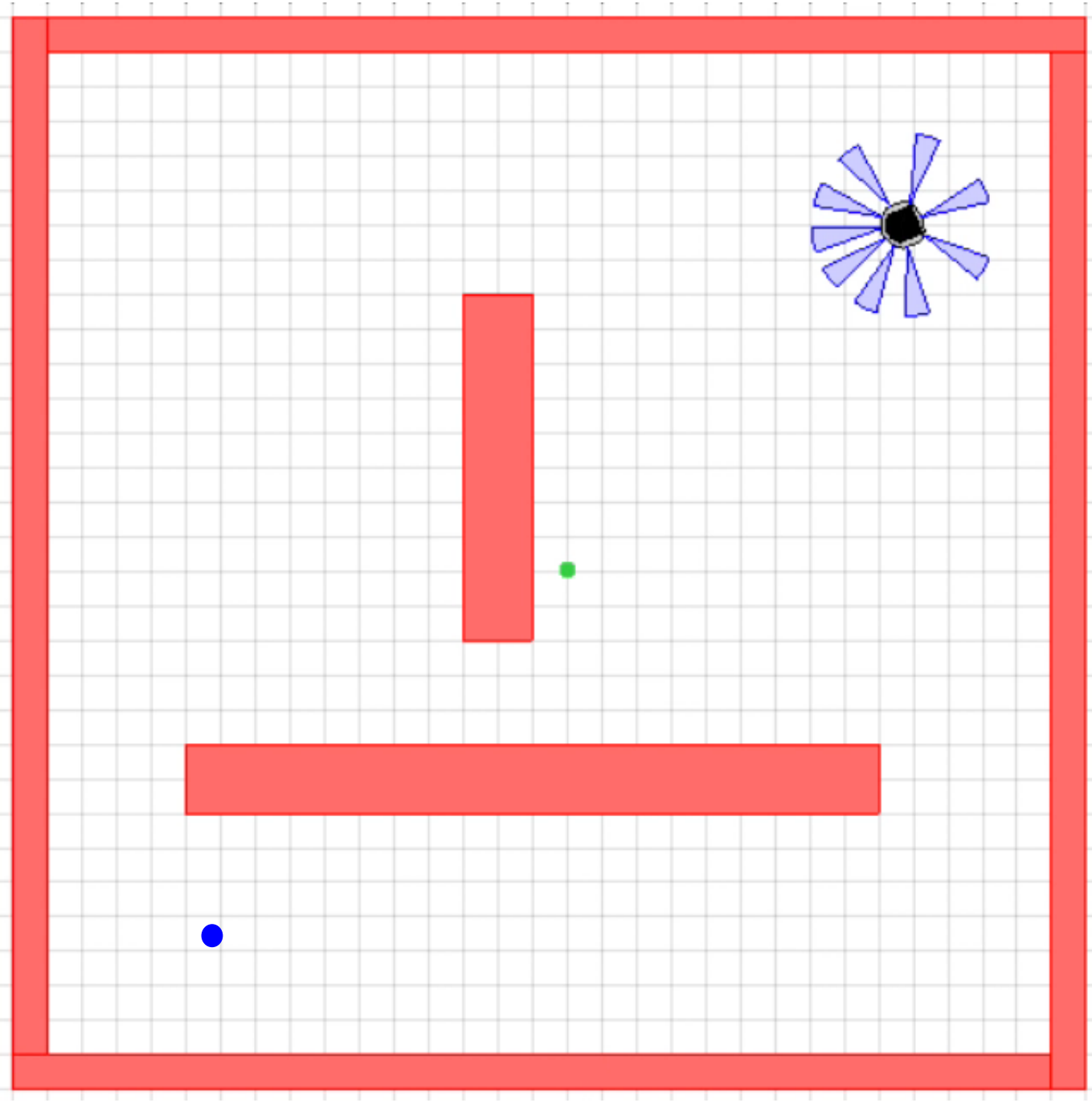


Week 6

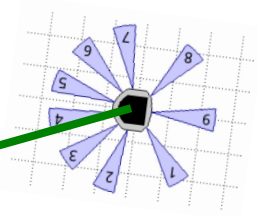
Same goal as last week

- steer the robot to reach a goal, *and*
- avoid nearby obstacles

but with a different method

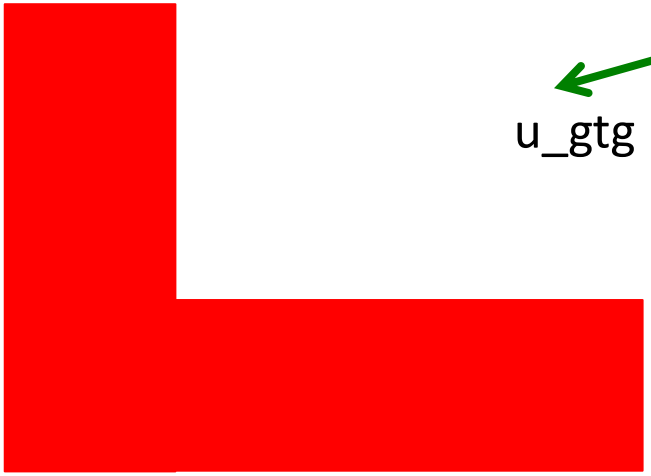
- *Switching* between controllers

No Obstacle Around



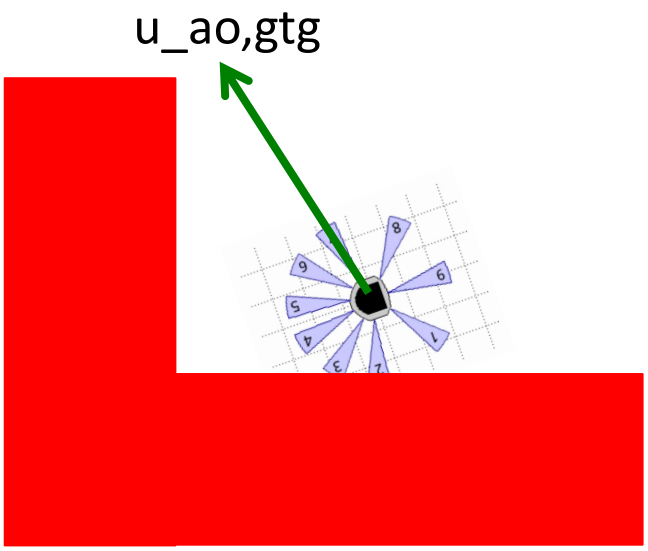
u_gtg

goal
(x*,y*)



Initially, use GoToGoal control.

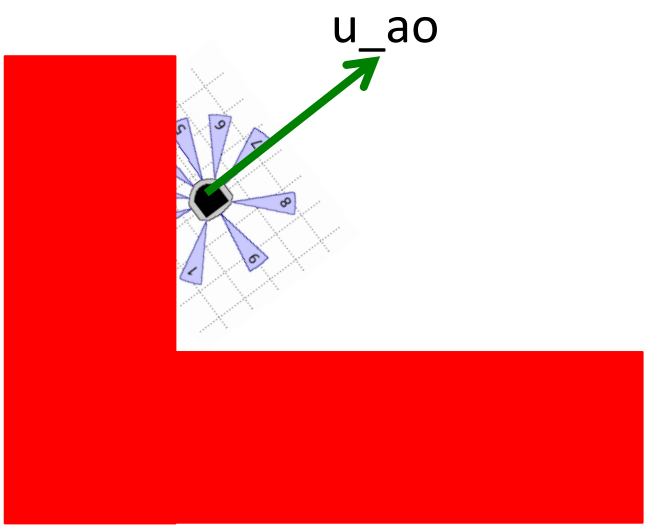
Obstacle Detected



goal
(x*,y*)

When close to an obstacle, use AOandGTG control.

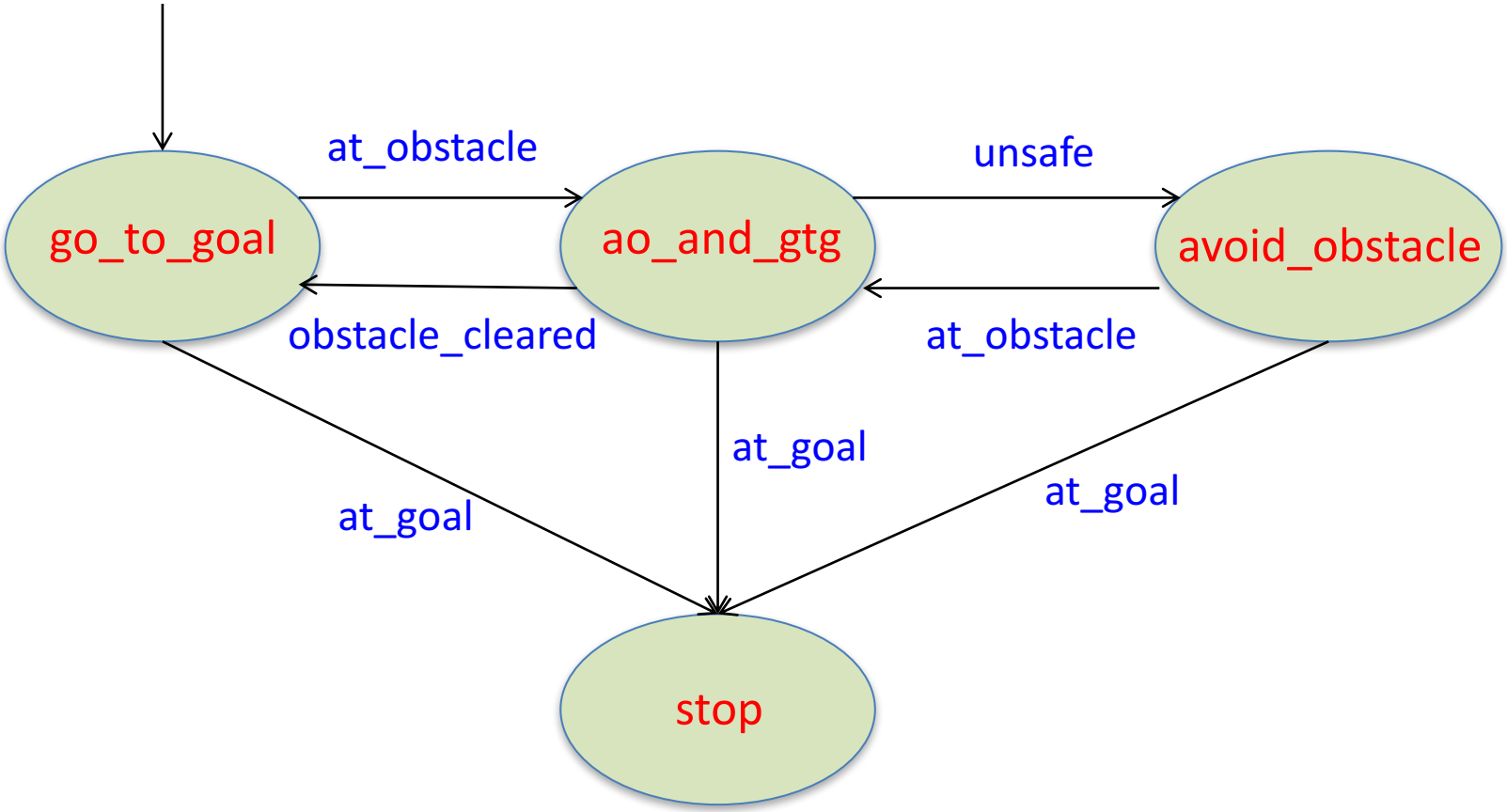
Too Close To Obstacle



goal
(x*,y*)

If too close to an obstacle (unsafe), use AvoidObstacle control.

Switching Controller



Code

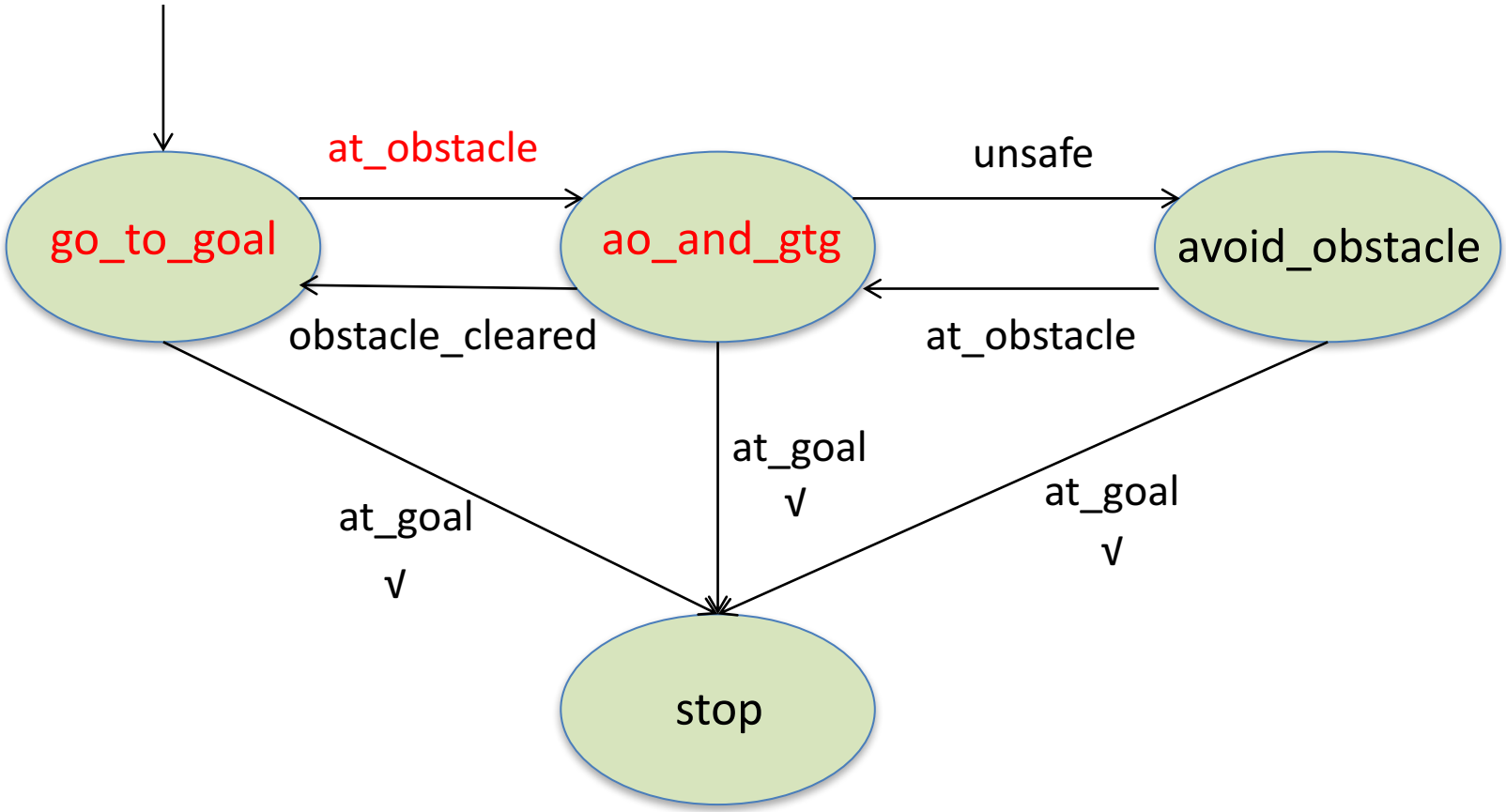
- +simiam/+controller/+khepera3/K3Supervisor.m
  - function obj=K3Supervisor()

```
% Input your code below %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%Specified (constant) speed
obj.v = 0; (change this to see what happens)
%Goal location
obj.goal = [-1,-1]; (change this to see what happens)
%Stop condition
obj.d_stop = 0.1; (change this to see what happens)
%Distance close to obstacles
obj.d_at_obs = 0.1; (change this to see what happens)
%Distance too close to obstacles (unsafe)
obj.d_unsafe = 0.1; (change this to see what happens)
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

Code

- +simiam/+controller/+khepera3/K3Supervisor.m
  - function execute(obj, dt)

```
% Input your code below %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% At controller 'go_to_goal', if 'at_obstacle' is true,
% then switch to controller 'ao_and_gtg’
        if(obj.is_in_state('go_to_goal'))
            if(obj.check_event('at_obstacle'))
                obj.switch_to_state('ao_and_gtg');
            end
        end
% Follow this example write all other switching rules
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```




```
% At controller 'go_to_goal', if 'at_obstacle' is true,
% then switch to controller 'ao_and_gtg'
        if(obj.is_in_state('go_to_goal'))
                if(obj.check_event('at_obstacle'))
                        obj.switch_to_state('ao_and_gtg');
                end
        end
```

Code

- +simiam/+controller/GoToGoal.m
  - function obj=GoToGoal(): see Lecture 3
- +simiam/+controller/AvoidObstacles.m
  - function obj = AvoidObstacles(): see Lecture 4
- +simiam/+controller/AOandGTG.m
  - function obj=AOandGTG(): see Lecture 5

Have Fun

- Change robot's initial pose in settings.xml
- Set robot's linear speed, goal location, and stop distance, distance close to obstacles, distance too close to obstacles in K3Supervisor.m
- Design controller switching logic in K3Supervisor.m
- Adjust parameters in GoToGoal.m, AvoidObstacles.m, and AOandGTG.m