

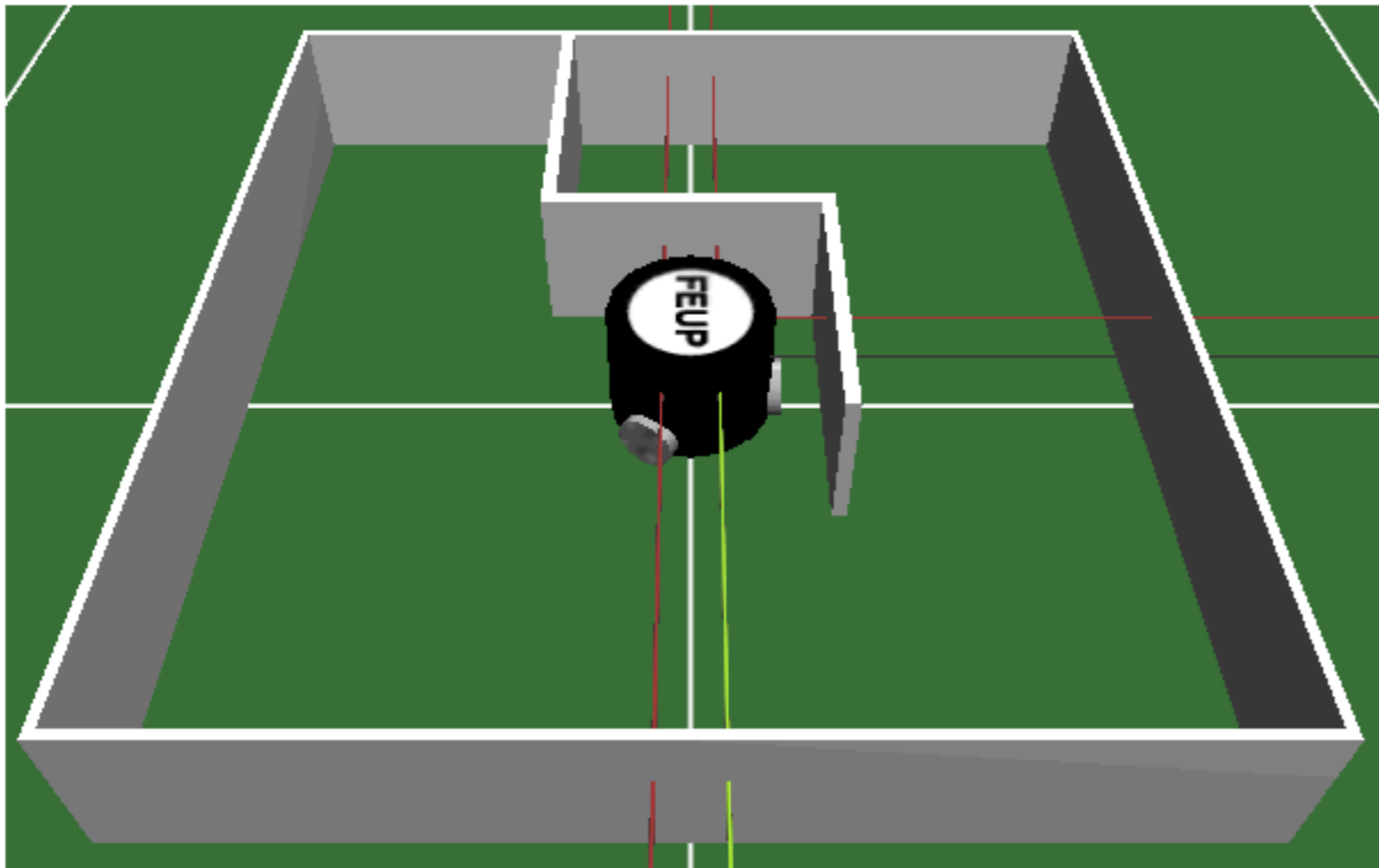
Code migration from a realistic simulator to a real wheeled mobile robot

José Gonçalves, José Lima, Paulo Malheiros and Paulo Costa

Department of Electrical Engineering and Computers
Faculty of Engineering of University of Porto

Introduction

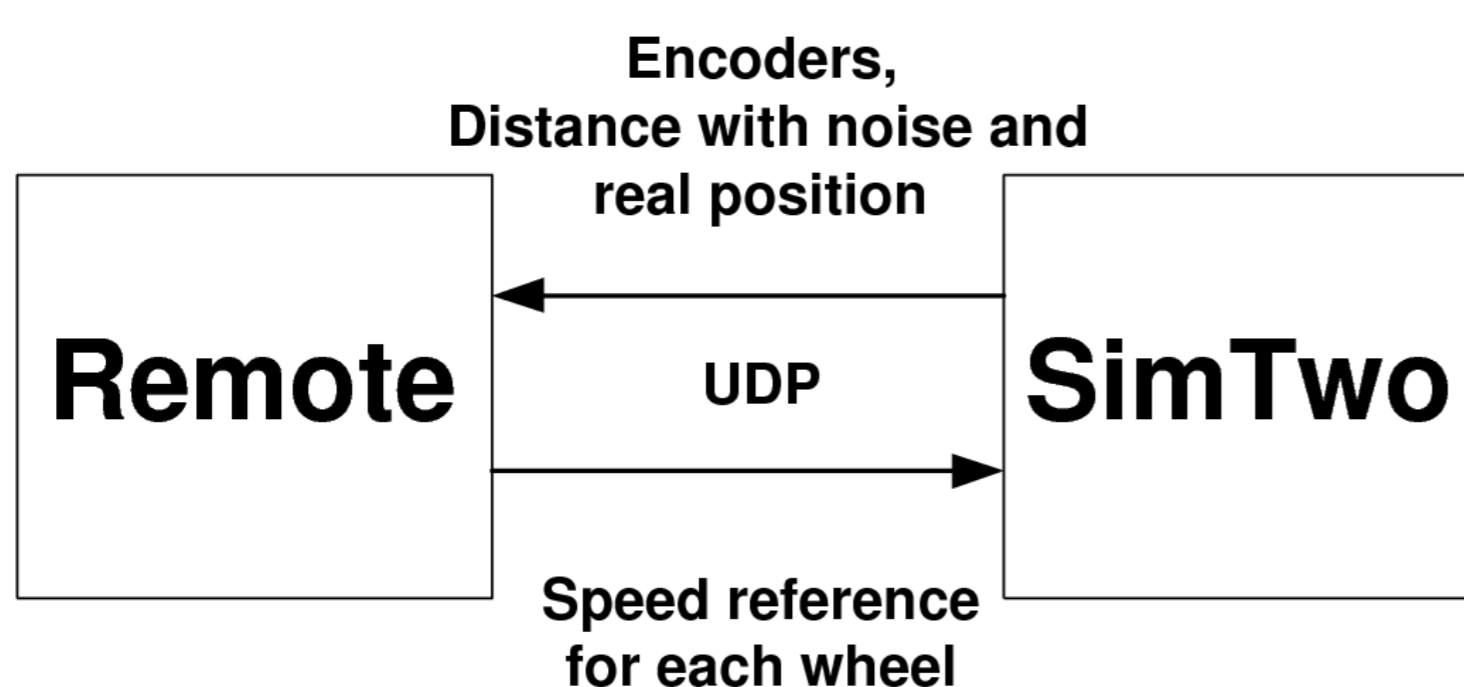
This paper describes the code migration from a realistic simulator to a real wheeled mobile robot. For this purpose it was developed a realistic simulator. The developed robot software consists in the localization and navigation of an omnidirectional robot in a structured environment.



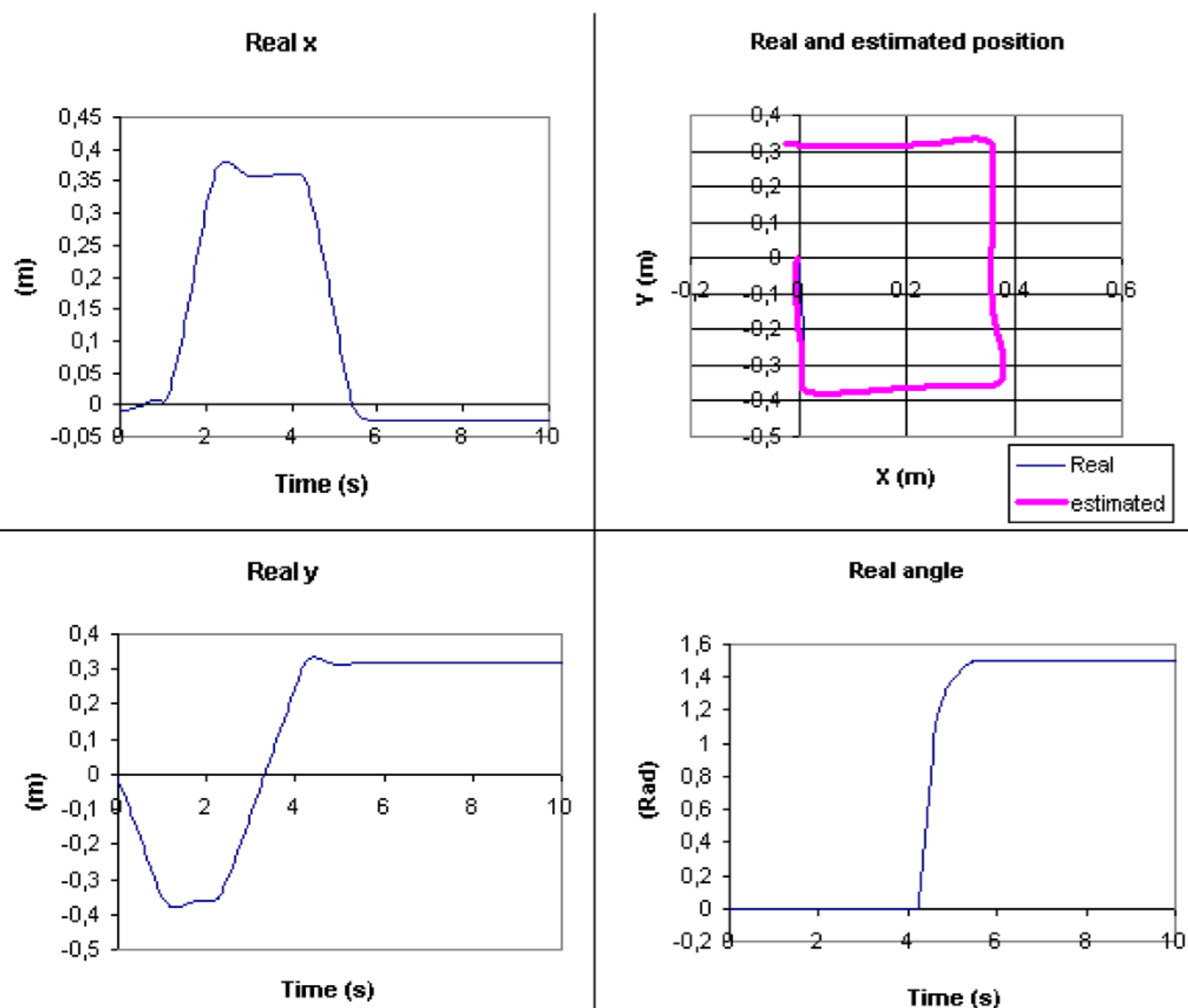
Robot simulator snapshot

Code generated with the simulator

Initially, the localization and navigation software is generated with the simulator. The simulator provides to a Remote application the distance sensors data with noise, the encoders data and the real robot position. The Remote application executes the localization and navigation algorithms and returns the speed references for each wheel to the simulator. The applied communication protocol to exchange data between the Remote application and the simulator is UDP.



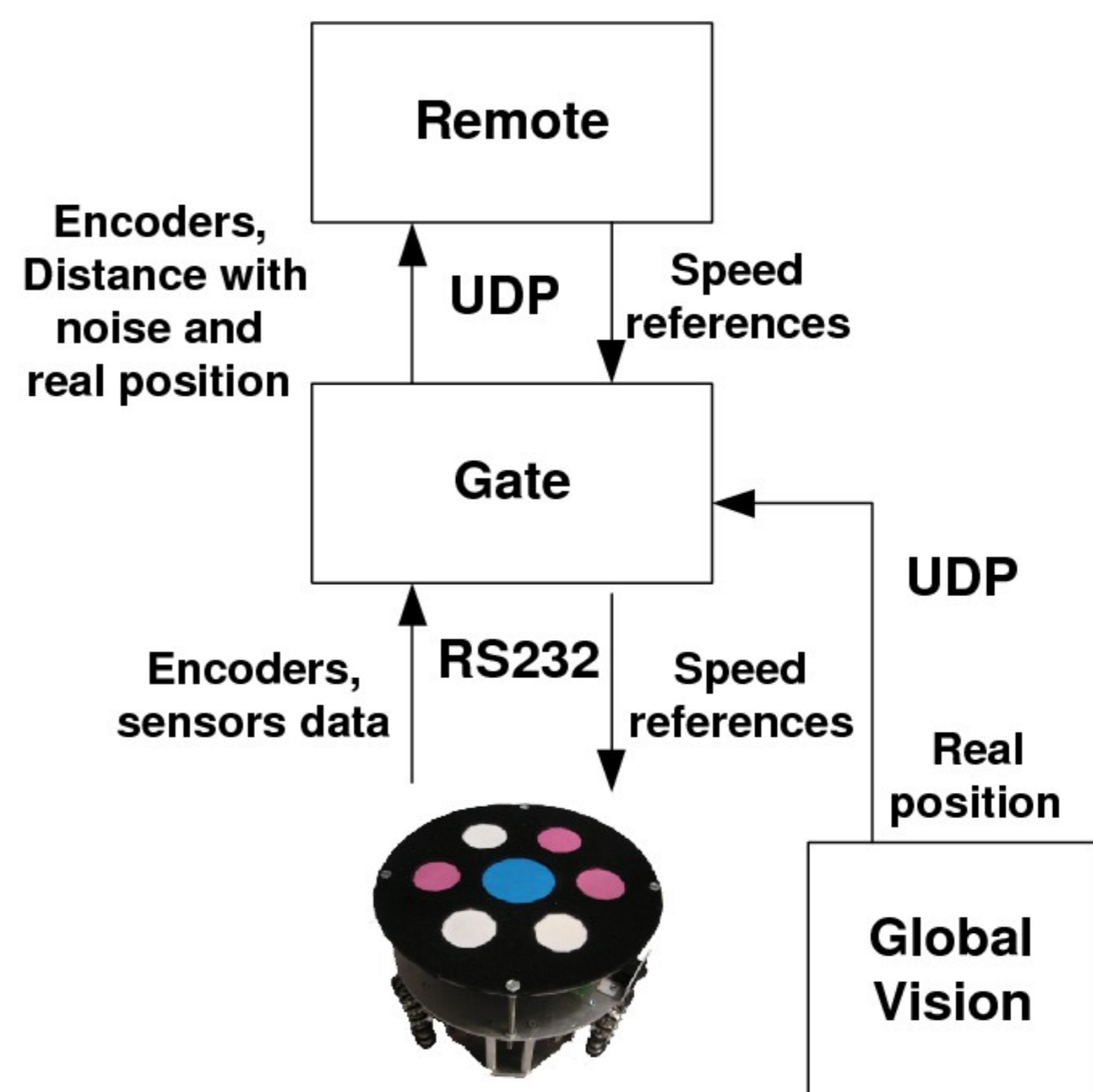
Simulator communicating with the Remote application



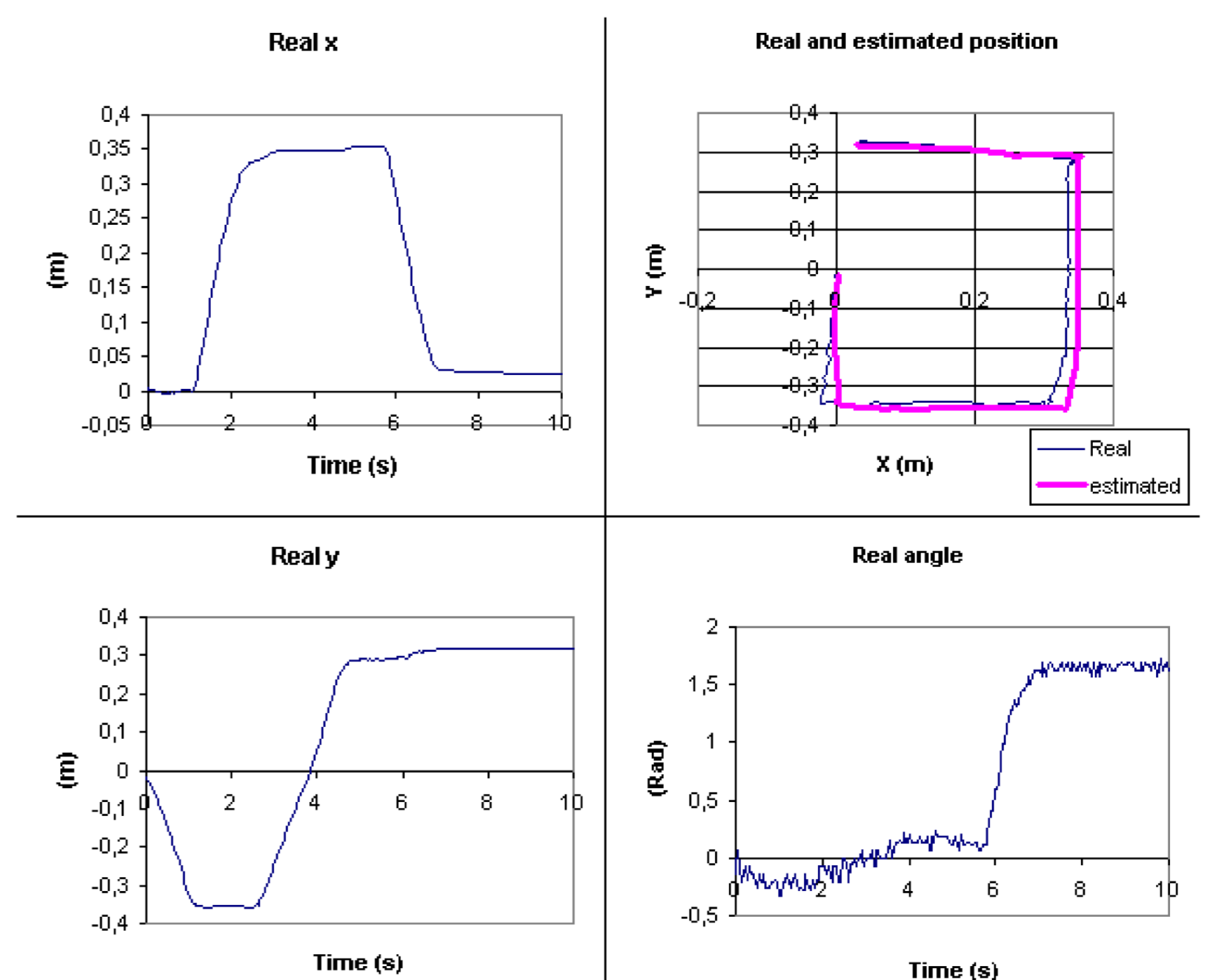
Simulated robot trajectory

Developed code applied to the real robot

The Remote Application is shared with the simulation so that the generated code can be applied to the real robot without any changes. The robot real position is provided to the Gate application at a 25 Hz rate, by a global vision system. The control loop is initiated by the robot when it sends to the Gate application, via RS232, the encoders and the sensor data at a 25 Hz rate.



Real world system architecture



Real robot trajectory

Conclusion

Code migration from realistic simulators to real world systems is the key for speeding up the developing time in robot software production. The developed code in the simulator was migrated to a real robot, reducing considerably the development time.