ME131 Vehicle Dynamics and Control

Lab 8: Lateral Control: Model Based

Assigned: 4/10/2019 Due: 4/17/2019, 11:59pm (On bCourses)

Please submit your homework solutions on bCourses as a single PDF of your solutions. When videos are required, please only submit the link as part of the solution PDF document. Late homeworks will be penalized.

Problem 1 Lab Deliverables (35pt)

1.1 (5pt) Completed kinematic equations in **subsystem 1** of the ME131_lab8.slx file from Task 1.1.

1.2 (5pt) Plot of the trajectories generated by the kinematic bicycle model and the dGPS data from Task 1.2.

1.3 (5pt) What do you observe by comparing the trajectories of open-loop prediction and the one provided from dGPS? Can you use your knowledge to explain which driving conditions the kinematic bicycle model would be suitable for. When does it fail? Task 1.3.

1.4 (5pt) Completed dynamics equations in **subsystem 2** of the ME131_lab8.slx file from Task 2.1.

1.5 (5pt) Plot of the trajectories generated by the dynamic bicycle model and the dGPS data from Task 2.2.

1.6 (5pt) What do you observe by comparing the trajectories of open-loop prediction and the one provided from dGPS? Can you use your knowledge to explain which driving conditions the dynamic bicycle model would be suitable for.Task 2.3.

1.7 (5pt) Compare the trajectories of both bicycle models and explain why one model outperforms the other in this case. Task 2.4.