

Vehicle Dynamics and Control

Fall 2010

Professor Kyongsu Yi

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**Vehicle Dynamics and Control Laboratory
Seoul National University**

Weekly Plan		
Week	Topics	comments
1	Course overview, Review – 3D dynamics	
2	3 DOF Planar Model, 2DOF Bicycle Model Linear Tire Model, Under steer coefficient	HW.1
3	2 DOF Bicycle model based steady state turning analysis Lane Keeping Dynamic Model	
4	Lane Keeping Control based on Lane Keeping Dynamic Model Error Analysis of Lane Keeping Controller	HW.2
5	Introduction of Tire Dynamics	
6	Tire Model (Dugoff tire model and Pacejka tire model) Lateral Stability (Phase Plane Analysis)	HW.3
7	Lateral Stability Control based on Phase Plane Analysis	HW.4
8	Longitudinal Vehicle Model-1 2 state Engine Dynamic Model	
9	Longitudinal Vehicle Model-2 Power Train Model and Wheel Dynamic Model (Longitudinal Tire Model)	
10	Smart Cruise Control: Set Speed Control Clearance Control	HW.5
11	String Stability – Definition, Norms, String Stability using Constant Spacing Policy	
12	String Stability based on Sliding Mode Control Method	
13	Vehicle Speed Estimator – Longitudinal and Lateral Velocity (based on 2DOF Bicycle Model)	
14	Review Kalman Filter Side Slip Angle Estimator using Nonlinear Tire Model	
15	Tire-Road Friction Estimator	HW.6
16	Review and Final Exam	Final Exam