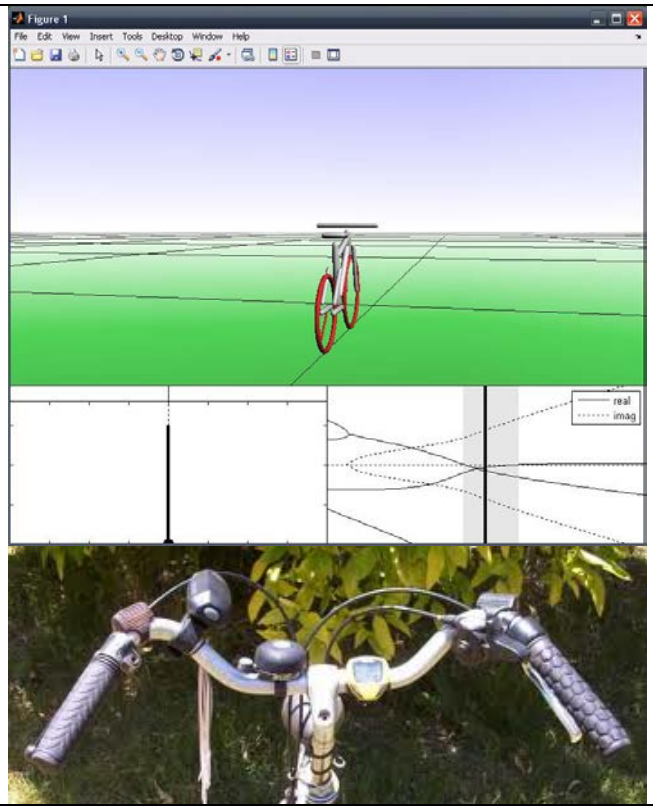
MSc. Assigment	**Haptic steer for a desktop bicycle simulator.**	
Key words	Bicycle, Dynamics, Simulator, Control, Mechatronic Design	
Introduction	The Delft Bicycle Laboratory wishes to develop a bicycle simulator: a stationary bicycle on a moveable platform, driven by a computer model of a bicycle, on which one can sit, steer, lean and pedal. As a first step, a simple desktop bicycle simulator has been built. The input device is a joystick for forward speed and steer torque commands and the output device for feedback control is a simple 3D avatar of the bicycle on a computer screen. It turns out that even an experienced bicycle rider *cannot* stabilize the unstable bicycle at low speed (v< 4 m/s). It is conjectured that the human controller needs haptic torque feedback for proper control.	
Project	Design, build, and test a bicycle handle bar with torque feedback which can be used as an input device for the simple bicycle desktop simulator.	
Project phases	The candidate will start by studying the literature on bicycle dynamics, and driving simulators with haptic feedback. Next, design a haptic steer for torque input with torque feedback and finally test the device on various groups of bicycle riders (novice, experienced, elderly).	

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