

# Report for the Course “Projektwettbewerb Konzepte der Regelungstechnik”

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**Abstract:** This is a template for the laboratory course “Projektwettbewerb Konzepte der Regelungstechnik” at the Institute for Systems Theory and Automatic Control, University of Stuttgart. Use this document to write your report with L<sup>A</sup>T<sub>E</sub>X (cf. [Knuth2005]).

## 1. INTRODUCTION

We have designed a state feedback for the single-track model based on inverse kinematics, loop-shaping, feedback linearization, and robot navigation functions.

## 2. MAIN IDEA

Our design procedure was based on the idea that accelerating a vehicle results in shorter lap times than braking a vehicle. For presentational conciseness, we have listed some important parameters in Table 1.

Table 1. Important Parameters.

Parameter	Value
lap time $t_f$	$\infty$
control gain $k$	0
steering angle $\delta$	$-\left(e^{i\pi} + 1\right)$

## 3. RESULT

We have achieved a lap time of  $t_f = \infty$ . We have depicted a plot of vehicle velocity  $v$  versus an independent curve parameter  $\gamma$ , with which we have parameterized the racetrack, in Fig. 1.

Curve Parameter  $\gamma$   
Vehicle Velocity  $v$

Fig. 1. Plot of Vehicle Velocity  $v$  versus Curve Parameter  $\gamma$  (—).

## REFERENCES

Knuth, D. E. (2005). The Art of Computer Programming. Pearson Education.