

## Optimal Path Following Road Vehicle Steering Control

**Robin S. Sharp**

*Imperial College London, Department of Electrical and Electronic Engineering, London, UK*

The theory of the discrete-time Linear Quadratic Regulator with road preview has been applied previously to minimum error path following control of an automobile. The results have shown how an optimal “driver” of a linear car can convert the path preview sample values into steering wheel displacement commands to cause the car to follow the previewed path with precision. Using the same theoretical basis, new results are generated to show optimal preview controls for cars and drivers with different layouts and priorities. A new performance criterion is set up, involving the minimisation of the preview distance required, and the sensitivities of this distance to variations in the car design parameters are calculated. The influence of additional rear steering is shown. The results yield new insights into driver steering control behaviour and vehicle design optimisation. They lead to some important conclusions about the way ahead for driver modelling from a steering control viewpoint.

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