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Anyone who has experience with a car, bicycle, motorcycle, or train knows that the dynamic behavior of different types of vehicles and even different vehicles of the same class varies significantly. For example, stability (or instability) is one of the most intriguing and mysterious aspects of vehicle dynamics. Why do some motorcycles sometimes exhibit a wobble of the front wheel when ridden "no hands" or a dangerous weaving motion at high speed? Why does a trailer suddenly begin to oscillate over several traffic lanes just because its load distribution is different from the usual? Other questions also arise: How do humans control an inherently unstable vehicle such as a bicycle and how could a vehicle be designed or modified with an automatic control system to improve its dynamic properties?

Using mainly linear vehicle dynamic models as well as discussion of nonlinear limiting effects, *Vehicle Dynamics, Stability, and Control, Second Edition* answers these questions and more. It illustrates the application of techniques from kinematics, rigid body dynamics, system dynamics, automatic control, stability theory, and aerodynamics to the study of the dynamic behavior of a number of vehicle types. In addition, it presents specialized topics dealing specifically with vehicle dynamics such as the force generation by pneumatic tires, railway wheels, and wings.

The idea that vehicles can exhibit dangerous behavior for no obvious reason is in itself fascinating. Particularly obvious in racing situations or in speed record attempts, dynamic problems are also ubiquitous in everyday life and are often the cause of serious accidents. Using relatively simple mathematical models, the book offers a satisfying introduction to the dynamics, stability, and control of vehicles.