Self-Balancing Two-Wheeler with Gyroscope

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Abstract: - *The bicycle's Environmental friendliness and light weight make it a good means transportation. A robot bicycle is, by nature, an unstable system whose inherit nonlinearity makes it difficult to control. This in turn, brings interesting challenges to control engineering community. Researchers have been exploring different mechatronic solutions for dynamically balancing and maneuvering robotbicycle. A self-balancing robot bicycle uses sensors to detect the roll angle of thebicycle and actuators to bring it into balance as needed, similar to an invertedpendulum. It is thus an unstable nonlinear system. A self-balancing robot bicycle can be implemented in several ways. In this work, we review these methods, and introduce our mechanism which involves a control moment gyro (CMG); an attitude control device typically used in spacecraftattitude control systems. A CMG consists of a spinning rotor and one or more motorized gimbals that tilt the rotor's angular momentum. As the rotor tilts, the changing angular momentum causes gyroscopic precession torque that balances the bicycle.*

Keyword: **-** Gyroscope, Gyro bike, CMG, etc.

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