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### Variable caster steering in vehicle dynamics

**Dai Vo Quoc** RMIT University, Australia

When a vehicle is cornering, its wheels usually lean outwards from the center of rotation. This effect decreases lateral force and eventually limits tyre performance, especially when the tyre is working under a high side slip regime. This paper proposes a strategy for varying caster of the front steerable wheels to counter the effect. The homogeneous transformation is utilized to develop the kinematics of a road steering wheel which includes the dynamic camber during the cornering manoeuvre. A variable caster scheme is proposed based on the analysis of the dynamic camber. A roll vehicle model and a camber-included tyre force model are constructed; and MATLAB/Simulink is used to simulate the dynamic behavior of the vehicle with and without the variable caster. The results of step-steer, ramp-steer and swept-steer simulations show that the outwards leaning effect of the steering wheels is reduced significantly, leading to an improvement in lateral acceleration, and yaw rate capacities without compromising with other handling characteristics.

#### Biography

Dai Vo Quoc is currently working toward his PhD degree in Automotive Engineering at School of Engineering, RMIT University, Australia. His research interests include kinematics, dynamics of vehicle systems; dynamics, ride, handling and stability of vehicles. He has published and written 5 papers and book chapters.

dai.voquoc@rmit.edu.au s3438339@student.rmit.edu.au

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