

BMA4723 VEHICLE DYNAMICS

Assignment 4

by

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Chapter Description

- Aims
 - To analyse the motions of the vehicle based on the side-slip angle and yaw moment.
- Expected Outcomes
 - Students are able to determine the travelling velocity, side-slip angle and forces generated at the tire.
- References
 - M.Abe, Vehicle Handling Dynamics Theory and Application, Second Edition, Published by Elsevier Ltd, 2015
 - Thomas D.Gillespie, Fundamental of Vehicle Dynamics, Published by Society of Automotive Engineers

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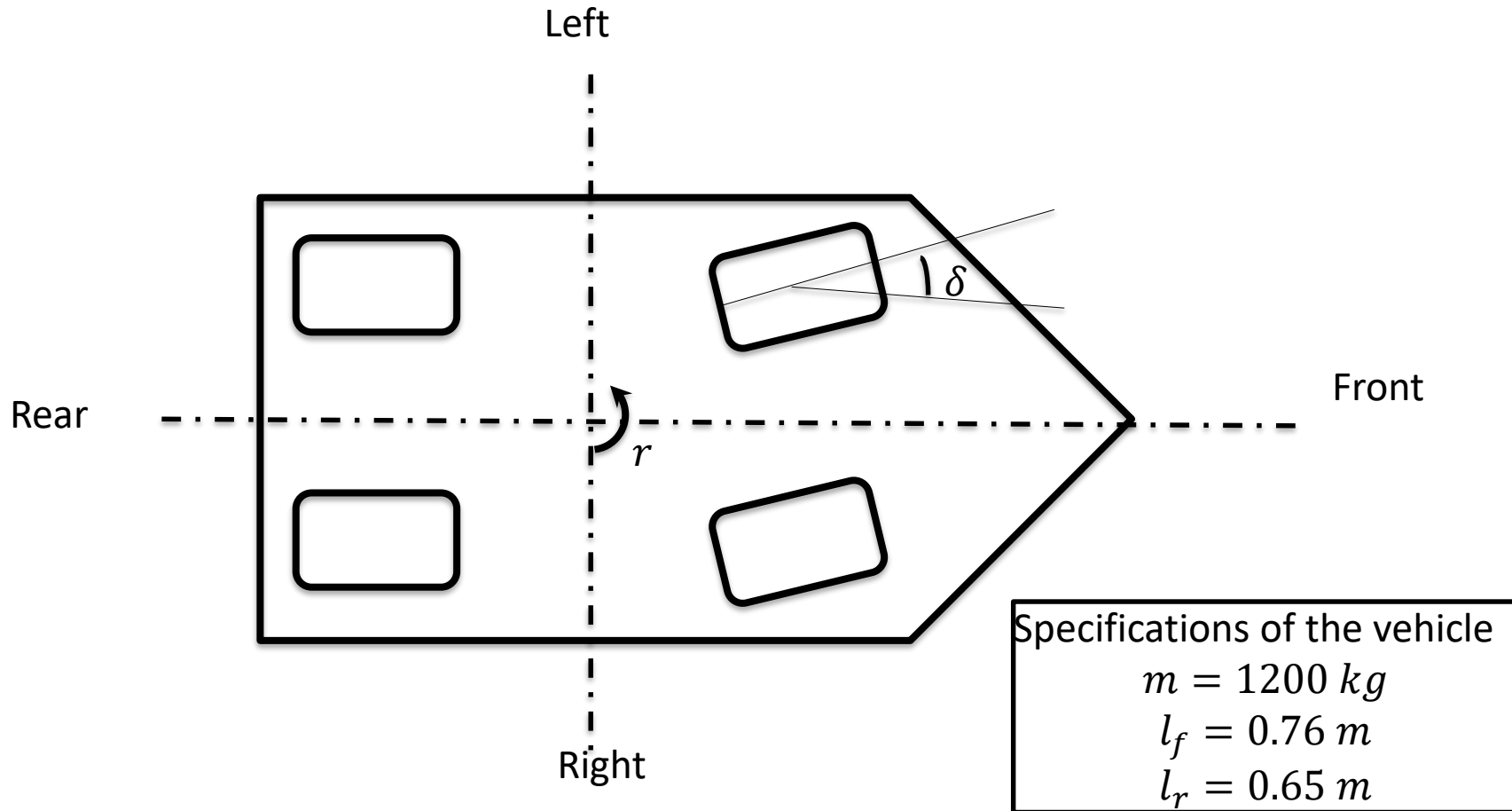


Fig.1 Vehicle model during cornering.

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Fig.1 shows the vehicle motion during cornering. The actual steer angle $\delta = 10^\circ$, the side slip angle of the vehicle $\beta = 2^\circ$, and the yaw angular velocity $r = 0.05 \text{ rad/s}$. At this situation, the lateral forces at the all tires is same, 1200 N. If the longitudinal velocity of the vehicle is 30 km/h, and the lateral velocity is 5 km/h, determine:

- a) The travelling velocity of the vehicle.
- b) The side-slip angle at each tire
- c) The longitudinal forces at the tire.

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