KTH Mekanik

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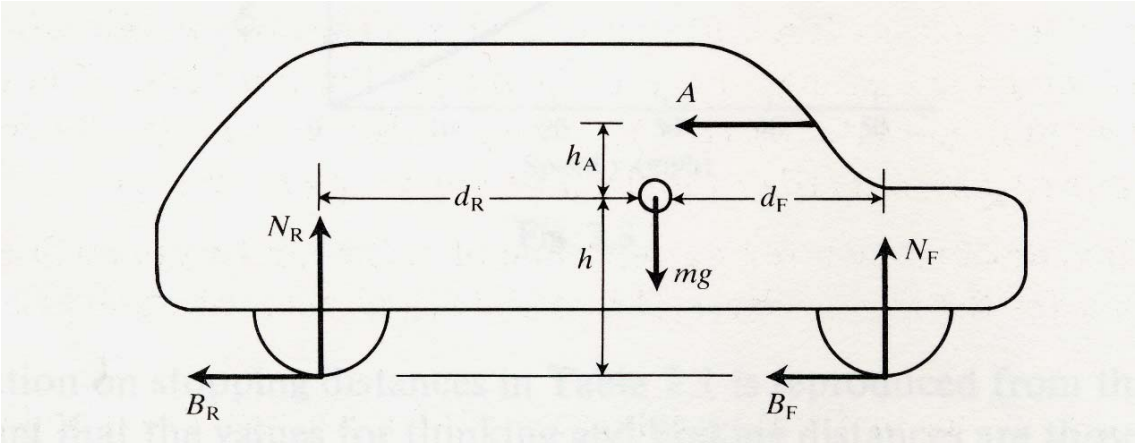
5C1106 Tillämpad fysik, mekanik, 4 poäng (6 ECTS)

Projekt: Konstruktion av bromssystem på bil

How is a braking system designed to fit a new car? At some stage in the design process, it will be necessary to design a system to fit the new model, some of whose characteristics affect the braking system. What sort of behavior do we want it to produce?

As a model, consider the car as a rigid body. The forces acting on it are shown in the figure, where N_F and N_R are the normal reactions on the wheels; B_F and B_R are the braking forces on the wheels; and A is the one-force resultant (enkraftresultanten) of the air resistance and other resistant forces.



A number of points are worth noting:
1. The position of the centre of gravity would be determined by the construction of the car, but would be arranged to coincide with what we might call the ‘centre of sideways pressure’. When a crosswind is blowing this will exert a pressure on the side of the car and this can effectively be replaced by single force acting at this centre of sideways pressure. If this point is not directly alongside the centre of gravity, the car will act like a weathervane and be difficult to control in crosswinds.
2. For similar reasons A, the ´center of resistance’, should act through the centre of gravity (*i.e.* $h_A = 0$).
3. In order to make the steering more effective it is probable that $d_F < d_R$ and $N_F > N_R$.