

Student Name

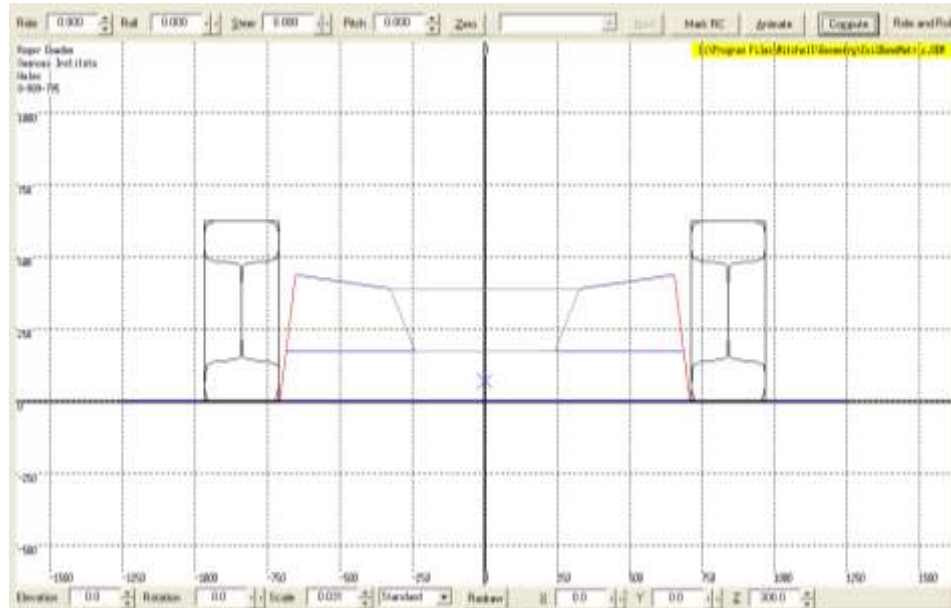
HND Motorsport Engineering and HND Automotive Engineering

How much do you know on Week One of Year 2?

Write your answers in the space provided in this question paper
Make sure your name is on this front cover

Question 1 Roll Centre

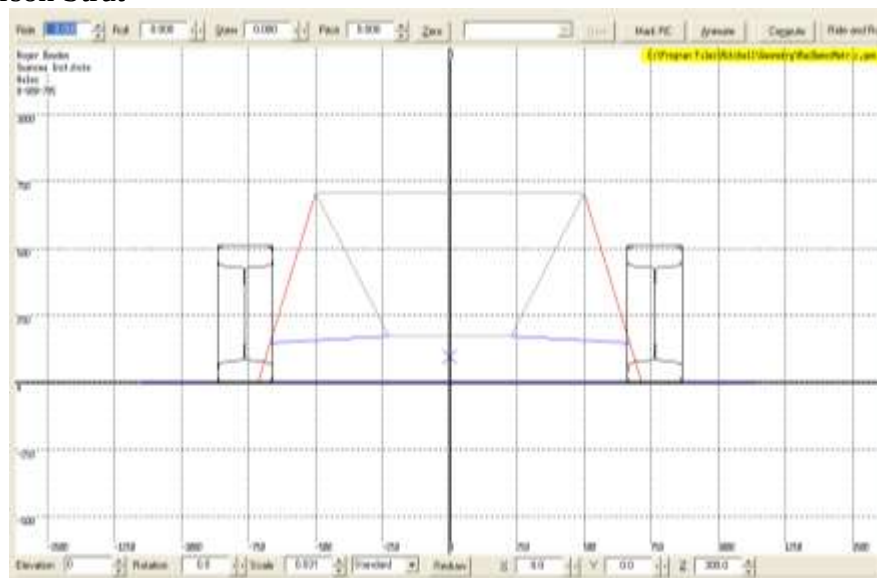
Double Wishbone



The diagram above shows a schematic of a double wishbone front suspension

- Demonstrate how to find the instant centres for the left and right wheels by drawing the appropriate construction lines on the diagram. Identify where the instant centres are located.
- The roll centre is shown. Show how it has been constructed by drawing in the appropriate construction lines.
- Identify the King Pin Inclination angle (KPI)

MacPherson Strut



- Repeat the exercise on the diag. of the Macpherson Strut type suspension above.

Question 2 Steering

The sketch below represents a cornering car with the actual and steered centre of turn identified.

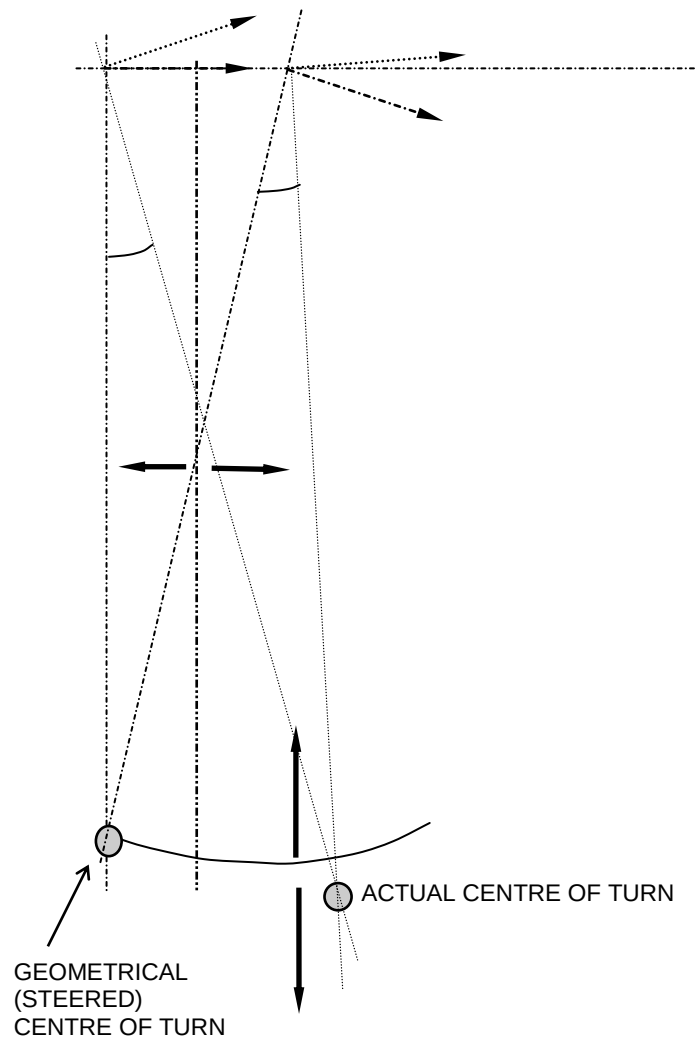
a) Identify the following for the front and rear wheels on the diagram :-

- Actual direction of travel
- Steered direction of travel
- Slip angle

b) Identify the Zero Yaw line on the diagram

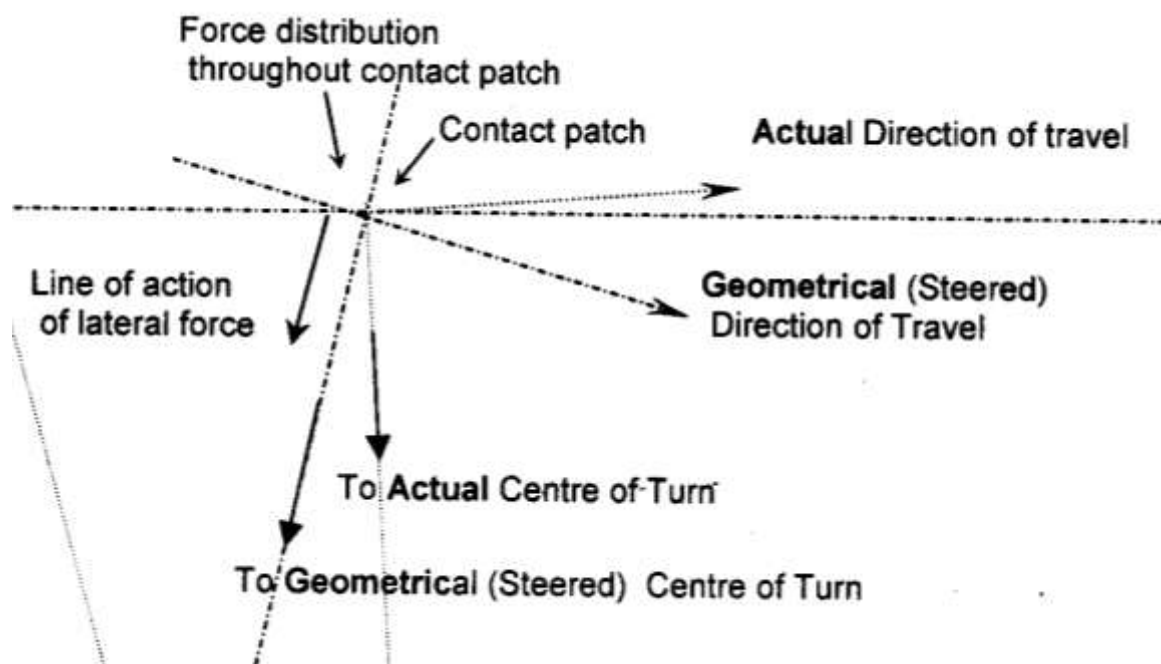
c) Is the car oversteering or understeering ?

d) Is the yaw angle exhibited tail out or nose out ?

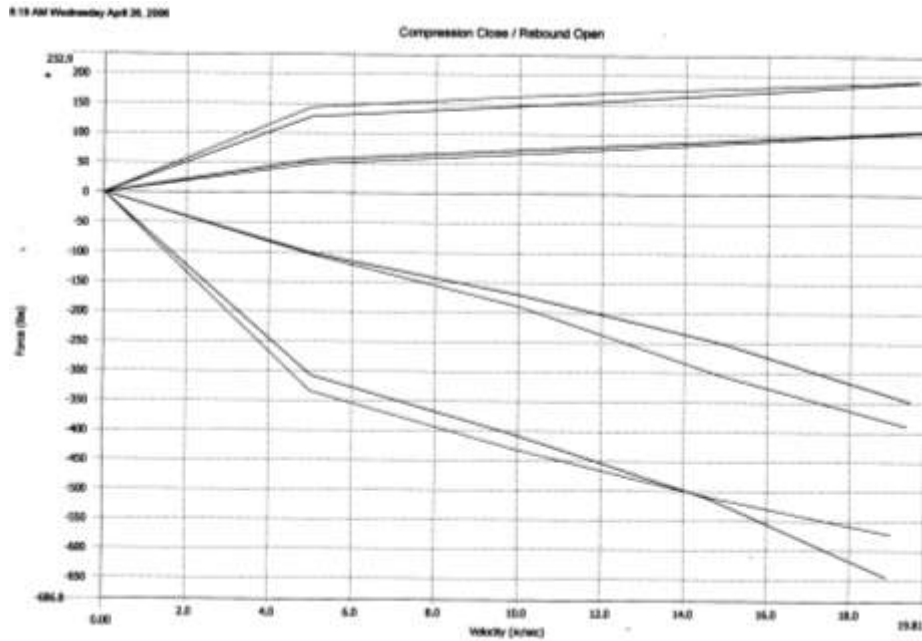


e) Explain how was the neutral steer line would have been constructed?

f) Sketch onto the diagram below the outline of the contact patch and the distribution of lateral force throughout the length of that contact patch



Question 4 Damping



The diagram above represents the damping characteristics of two of the adjustable dampers on the Locost

Identify on the diagram the maximum bump and maximum rebound curves

In simple terms explain what element of the design of a typical hydraulic damper controls the amount of force produced by the damper at:

i) low piston speed

ii) high piston speed

What vehicle behaviour is controlled by the damper when it is operating in the low piston speed range
