# EasyDyn problem: Nose suspension of a plane

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March 23, 2004

## 1 Description of the system

The system depicted in figure 1 is the mechanism of the nose suspension of a plane. It consists of a rod OA, a bar AC and a jack OB. The rod OA is attached to the ground by a revolute joint in O. Bars OA and AC can rotate with respect to each other in A. The mid point of bar AC (point B) is attached to the end of the jack so that it moves only vertically. The effect of the jack is modelled by a spring of stiffness $k$ and rest length $L_0$, mounted between points O and B.

To account for the weight of the plane, a mass is added on point C and the gravity is defined **upwards**.

The system owns only one degree of freedom, the imposed configuration parameter being the angle between OA (or AC) with respect to the horizontal. The dimensional and inertia characteristics are given on the figure.

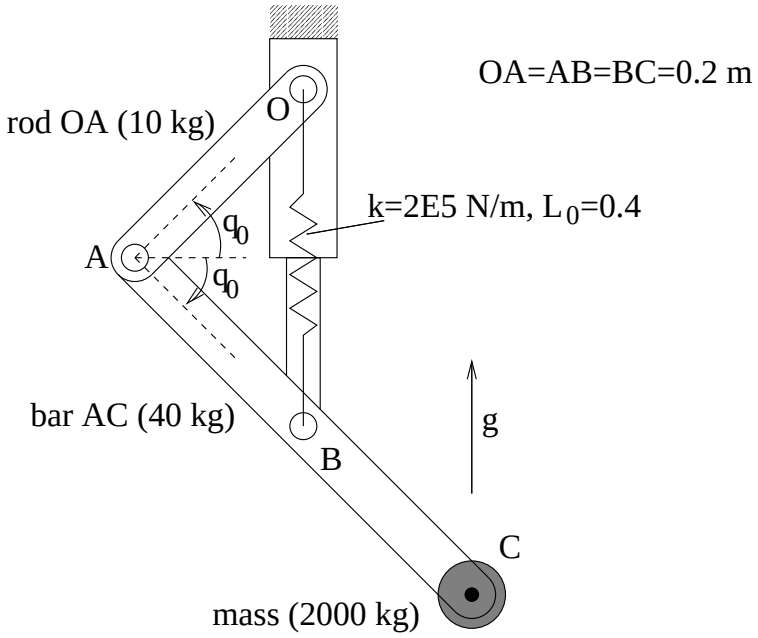


Figure 1: Nose suspension

## 2 Requested results

Determine the equilibrium position of the system.

If a damper is mounted in parallel with the spring, determine a value of the damping constant $c$ leading to a suitable damping of the system.

# 3 Typical results

The equilibrium position corresponds to $q_0$=0.677 rad.

Figure 2 shows the free motion of the system from an initial position out of equilibrium. The response shows that the chosen damping coefficient can be considered as suitable.

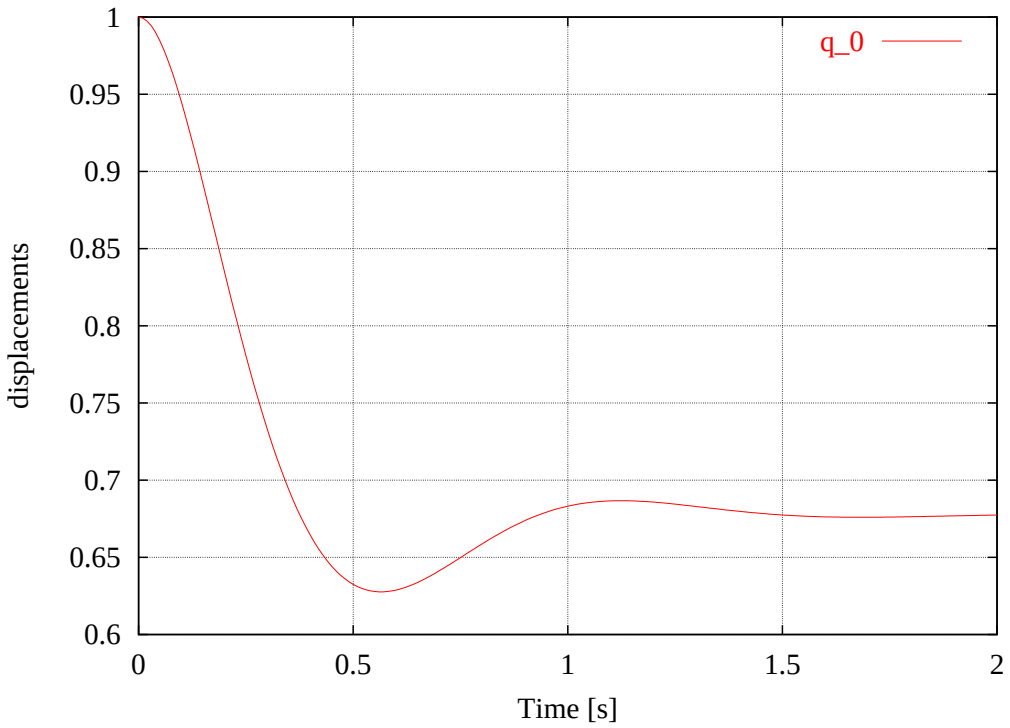


Figure 2: Damped response of the suspension