EasyDyn problem : Sliding Pendulum

O. Verlinden, G. Kouroussis

17 mars 2004

1 Description of the system

The considered system is represented in figure 1. It consists of a body $S_0$ in translation with respect to $x$ axis. The second body, $S_1$, is a pendulum attached to the previous body by a revolute joint of horizontal axis ($z$ axis).

Fig. 1 - Sliding pendulum ($b = 1.5 \, m$, $h = 0.5 \, m$, $l = 2 \, m$, $m_0 = 5 \, kg$, $m_1 = 2 \, kg$)

2 Requested results

It is asked to simulate the behaviour of the system, subjected to gravity, with the initial condition $q_1 = \pi/2$.

The problem will be solved in two manners
1. by expressing the kinematics from the classical laws of mechanics, with the help of the vector operators implemented in EasyDyn;
2. with the help of the CAGeM utility.

The simulation will be performed from 0 to 5 s.
3 Typical results

Figures 2 to 4 give the expected evolutions of the configuration parameters and their time derivatives.

**Fig. 2** – Evolution of configuration parameters

**Fig. 3** – Evolution of first time derivatives of configuration parameters
Fig. 4 – Evolution of second time derivatives of configuration parameters