EasyDyn problem: Silder–Crank mechanism

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March 17, 2004

1 Description of the system

The slider–crank is one of the most popular mechanical mechanism. We recognize it, since it is used in the internal combuston engine (figure 1), wherein the input force is the gas pressure on the piston.

Figure 1: Internal combustion engine view

The complete engine can be simulated but only one slider–crank mechanism (figure 2) will be envisaged in the case of this example.

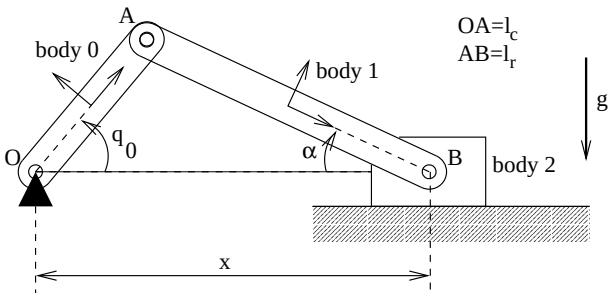

Figure 2: Slider–crank mechanism scheme ($m_0 = 1\,kg$, $m_1 = 2\,kg$, $m_2 = 5\,kg$, $l_c = 1\,m$ et $l_r = 2\,m$)

2 Requested results

It is asked to simulate the behaviour of the system, subjected to gravity, with the initial condition $q_0 = 1\,rad$.

3 Typical results

Figures 3 to 5 give the expected evolutions of the body parameters and their time derivatives.

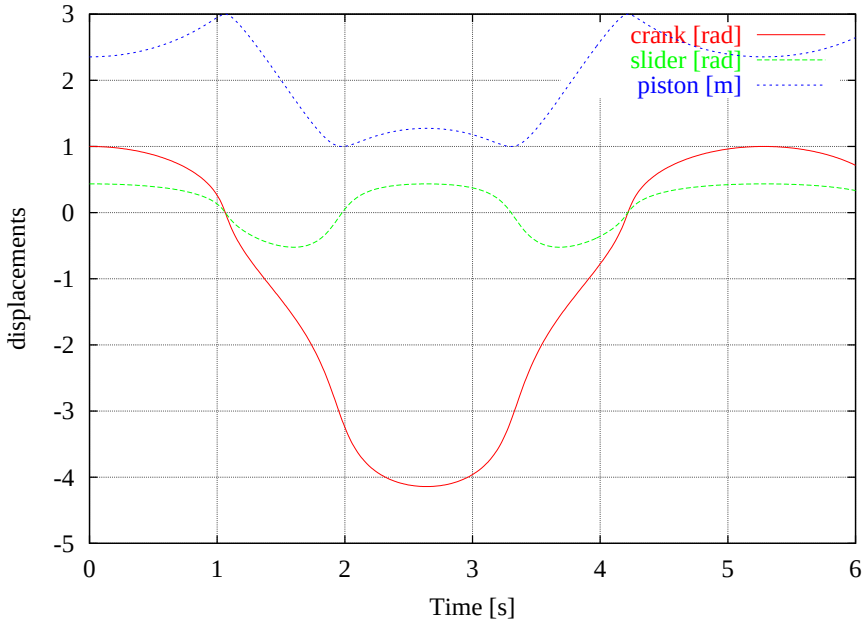

Figure 3: Evolution of configuration parameters

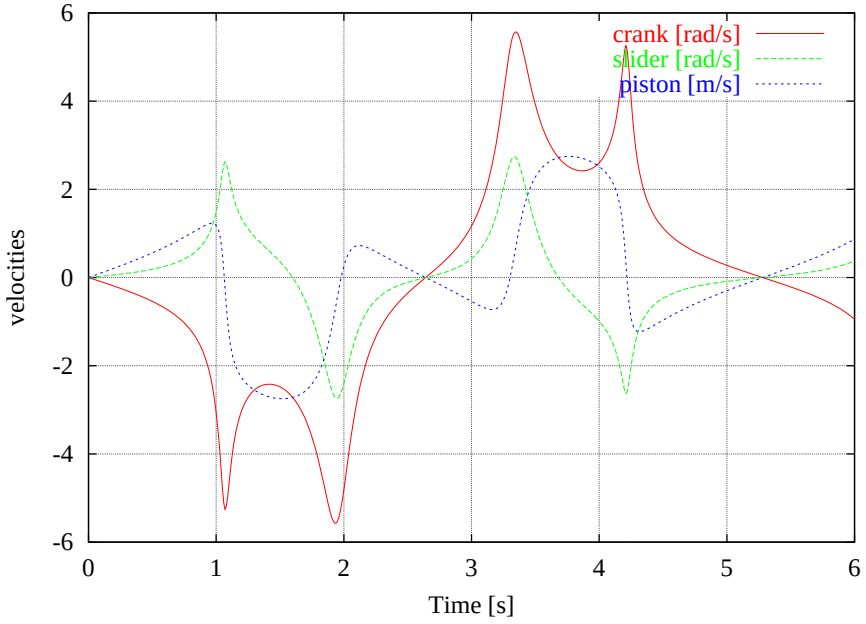

Figure 4: Evolution of first time derivatives of configuration parameters

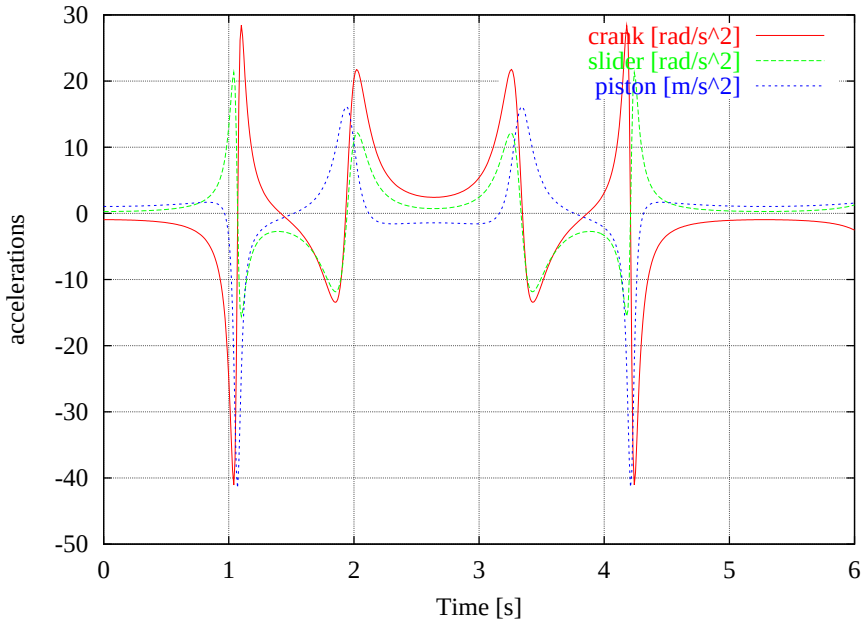

Figure 5: Evolution of second time derivatives of configuration parameters