Simulation Engineering Exercises 06

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Language: JAVA
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1. Circus Trapeze with Real Time

If input provider or output consumer is under the constraint of wall clock, then the simulation time and wall clock shall be the same. That is a real time simulation.

Assumptions:

NULL.

Mathematical Model:

NULL.

Main code:

```
while (t <= end_time) {
    try {
        Thread.sleep((int) (time_step_size * 1000));
    } catch (InterruptedException e) {
        e.printStackTrace();
    }
    double th_temp = th;
    th = th + th_v * time_step_size;
    th_v += (-g / length * Math.sin(th_temp)) * time_step_size;
    t += time_step_size;
    state = new AcrobatState(Math.round(t * 1000) / 1000.0, th, th_v);
    System.out.println(Math.round(t * 1000) / 1000.0 + ": " + th);
    state_list.add(state);
}
```

I did not install the Java RTS successfully, so I could not develop a real Real-Time program in JAVA. Then I make a cheating. I develop this program which just sleeps for the designed time. Because the calculation is fast, I don't need to adapt the time for the real time.

Graph:

NULL.

Output results:

This program uses the EULER method, so the result is in EULER. I print the real start time and the real end time:

Start at: Thu Dec 04 02:19:21 CET 2014

0.01: 0.7853981633974483
0.02: 0.7852595704683357
0.03: 0.7849823846101106
0.04: 0.784566625032104
0.05: 0.7840123301609624
……
9.95: 0.6206520884286318
9.96: 0.6126771698554161
9.97: 0.6045882643936932
9.98: 0.5963866472226348
9.99: 0.5880736190701433
10.0: 0.579650506230897
10.01: 0.5711186605721212
End at: Thu Dec 04 02:19:31 CET 2014

Conclusion:
NULL.

Code:

https://github.com/sampig/SimulationEngineering