

Re: Rigid Body dynamics and solution methods

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- *From:* Keith Refson <kr@xxxxxxxxxxxxxxxxx>
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Preben wrote:

Just to sum up what I really have done... It seems like this could be an advantage for me and you.

Now I solve the systems of equations:

$$M * \mu = -F - T$$

to find the constraint force multipliers and next calculate the accelerations :

```
ublas::vector<double> accel = -dV + prod(trans(dG), mu);
for (unsigned int i = 0; i < m.size(); ++i) {
    accel(i) = accel(i)/m(i);
}
```

now it should be possible to use a method for solving the equations of motion!

Is this a bad method?

It is not completely wrong, but it has enabled you to ignore a very pertinent fact, namely that the accelerations depend on the velocities. In a pure rigid-body case these terms give rise to centripetal and Coriolis-like forces.

If you attempt to integrate such a Hamiltonian in generalised co-ordinates using standard velocity-Verlet or any other straightforward integration algorithm you will find that energy is not conserved. This is because you are implicitly using the velocities from step n but co-ordinates from n+1 to evaluate the accelerations. Please re-read my earlier posting where you will find a better discussion of this issue.

Keith Refson

