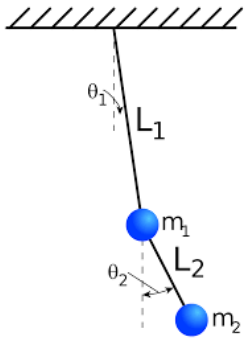
Assignment-6 (April 9) **deadline: 10th April, 2019**

Assignments must be submitted in the form of report along with MATLAB codes.

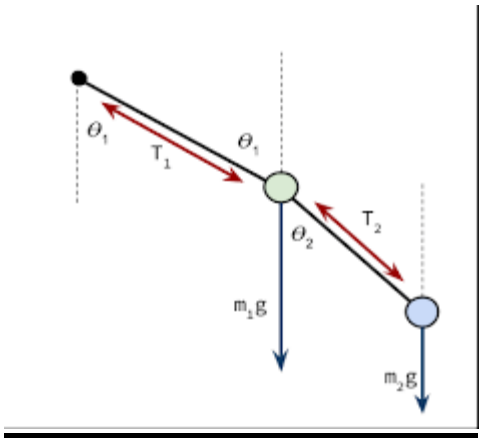
Computational Investigation of Double Pendulum



- Derive the **Euler-Lagrange DEs** for double pendulum as discussed during the lecture.
- Using **the above equations**to computationally investigate the dynamics of double pendulum.
- Choose different set of initial conditions (mass, lengths etc.) and study the effect on the dynamics.
- Plot the movement in x-y space. (make conclusions about the parametric plot)
- Plot time vs thetas (generalized coordinates).
- With the help of a plot prove that your code/ implementation is accurate.
- What are the conclusions if the initial angular displacements are small?
- What are the conclusions if the initial angular displacements are large?

- Introduce animation in your implementation as shown during the lecture and study the system.
- How do chaotic orbits change with different initial conditions?

(Do not add unnecessary plots in the report if it does not lead to any sound conclusion).



(optional) Solve the above problem using Newtonian formulation, implement it computationally and check if you get the same (E-L formulation) dynamics (as well as same conclusions) with similar initial conditions.