DSM **2024** **Homework #04**

Deadline: March 22, 2024 (via dropbox)

(Dropbox file request: https://www.dropbox.com/request/18Xf1bAcrRrSXffubAZA)

Name:____Number:_______________________

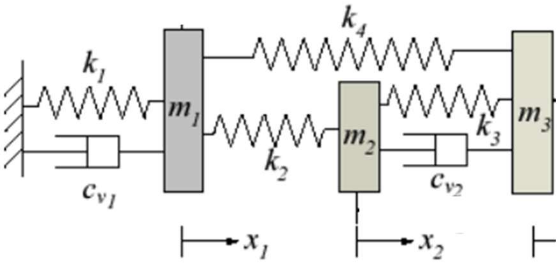
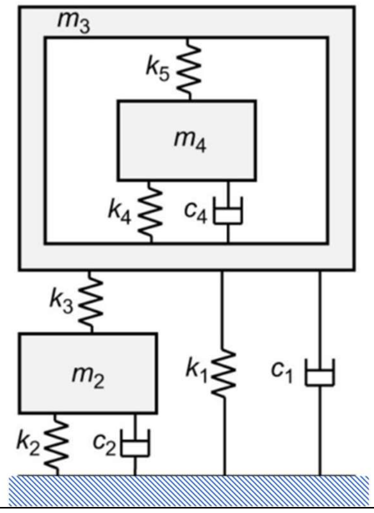
Implement and run the Matlab Dynamic Analysis code developed in class, and later explored in the Lab classes, with the spring-mass system associated to your student number. Show, in a plot, the trajectory of the system masses as a function of time for 2 complete oscillations of the slower mass. Deliver the printed Matlab code and the dynamic response requested. The data supplied applies to all systems (even if for some of then it is not realistic).

(Note: You must fix the code developed in class as there is no guarantee that it is correct)

For extra points: Compare the accuracy and the CPU time of solving the problem with at least 3 different time integrators of your choice. Draw a reasonable conclusion

NOTE: (<u>New way to calculate the number of your mechanism</u>) Depending on your student number, select one of the 3 mechanisms for your homework. The algorithm for the selection is:
SystemNumber = 7xStudentNumber – Integer(7xStudentNumber/3)x3 + 1.
Note that Integer(7*StudentNumber/3) is the integer obtained by truncation of the real number. In `Matlab` just calculate the mechanism number using:

```
SystemNumber = 7*StudentNumber - floor(7*StudentNumber/3)*3+1;
```

<table>
<tr>
<td>SystemNumber 1

</td>
<td>SystemNumber 2:

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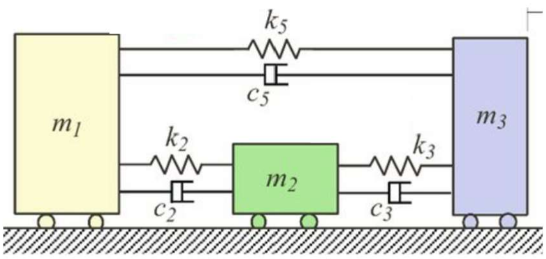
</tr>
<tr>
<td>SystemNumber 3

</td>
<td></td>
</tr>
</table>

$m_0 = 5$ kg; $k_0 = 10$ N/m; $l^0_0 = 0.5$ m; $c_0 = 4$ N/m s;

$m_1 = 15$ kg; $k_1 = 23$ N/m; $l^0_1 = 1$ m; $c_1 = 3$ N/m s;

$m_2 = 25$ kg; $k_2 = 25$ N/m; $l^0_2 = 0.5$ m; $c_2 = 2$ N/m s;

$m_3 = 5$ kg; $k_3 = 16$ N/m; $l^0_3 = 0.1$ m; $c_3 = 2$ N/m s;

$m_4 = 7$ kg; $k_4 = 30$ N/m; $l^0_4 = 0.5$ m; $c_4 = 5$ N/m s;

$m_5 = 3$ kg; $k_5 = 30$ N/m; $l^0_5 = 0.2$ m; $c_5 = 1$ N/m s;

$m_6 = 1$ kg; $k_6 = 10$ N/m; $l^0_6 = 0.7$ m; $c_6 = 0$ N/m s;