Study single-mass system

The objectives of the task: The successful completion of the task the student will be able to calculation schemes and mathematical models of single-mass vibrating system, explore the model in the environment Scilab, analyze the results..

Task Requirements: Study the dynamics of single-mass vibration system. Evaluate the work of one of your classmates.

Instructions for performing:

1. Given oscillatory system scheme. You need to:

   - place the forces acting on the system;

   - create a mathematical model (equation);

   - solve the equation in Scilab environment;

   - select the parameters (m, c, alpha) so that damped oscillations as soon as possible;

   - obtain graphics for each parameter.

2. Click to "Add a topic" (**Добавить тему для обсуждения**).

3. In the line "Topic" (**Тема**) write your name and initials.

4. In the field "Message" (**Сообщение**) to insert:

   - calculation scheme single-mass vibration system;

   - mathematical model (equation);

   - solution of the equation Scilab environment;

   - graphics with a few values of the parameters (m, c, alpha);

5. Click "Send in the forum" (**Отправить в форум**).

6. Enter in the "Topic of discussion" to any of your bandmates by clicking on the hyperlink of his (her) surname. In order to estimate messages, select the participants, who do not have a comment to the work.

7. Click on the hyperlink "Reply" (**Ответить**) votes Your Rating and give reasons for it.

<u>**Evaluation criteria:**</u>

Fulfillment of exercise - 2 points:

- place the forces acting on the system; - 0.4 points

- create a mathematical model (equation);- 0.4 points

- solve the equation in Scilab environment; - 0.4 points

- select the parameters (m, c, alpha) so that damped oscillations as soon as possible; - 0.4 points

- obtain graphics for each parameter. - 0.4 points

Placement of the results on the forum - 1 point:

- calculation scheme single-mass vibration system; - 0.2 points

- mathematical model (equation); - 0.2 points

- solution of the equation Scilab environment; - 0.2 points

- graphics with a few values of the parameters (m, c, alpha); - 0.2 points

- available comments - 0.2 points

Assessment of your bandmates - 2 points:

- place the forces acting on the system; - 0.4 points

- create a mathematical model (equation);- 0.4 points

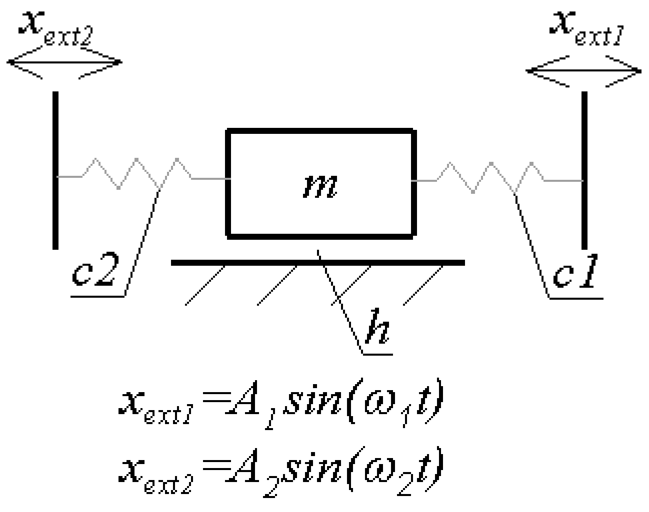
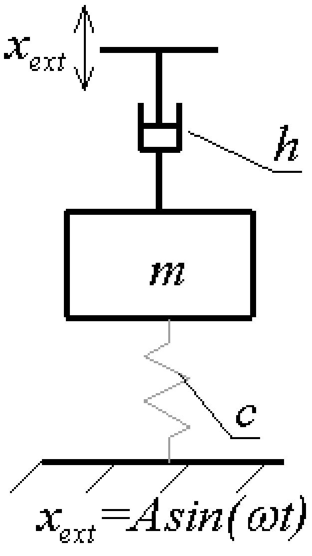
- solve the equation in Scilab environment; - 0.4 points

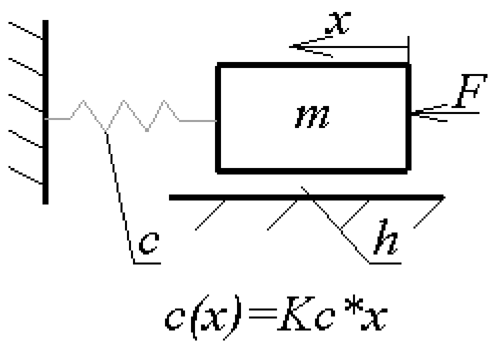
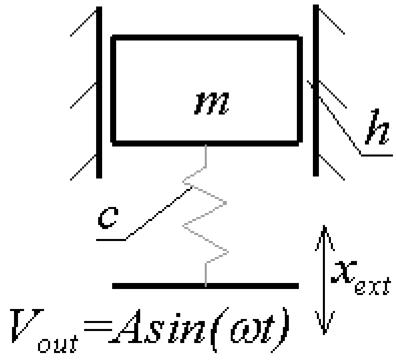
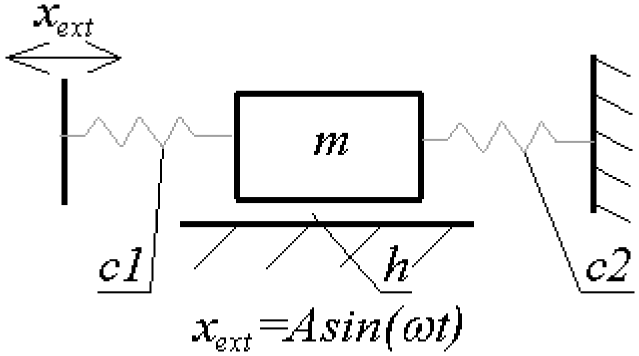
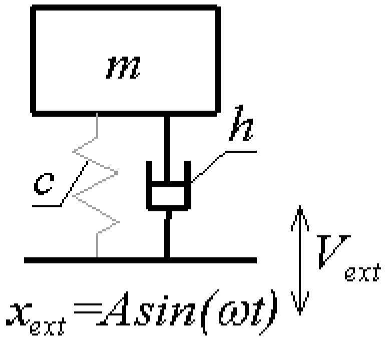
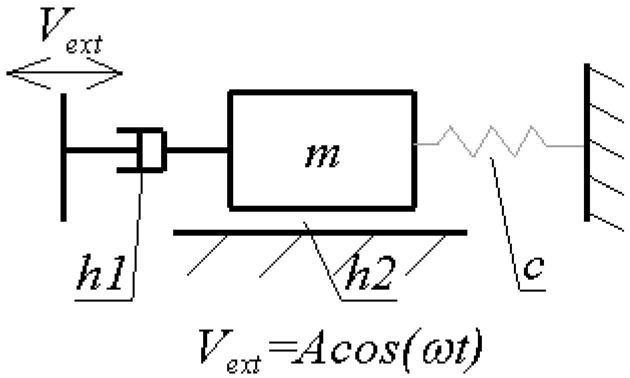
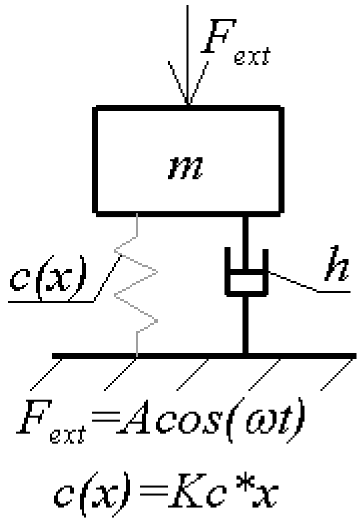
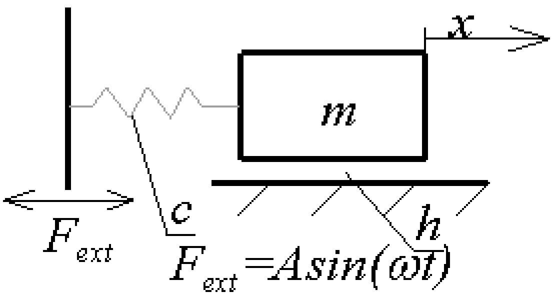
- select the parameters (m, c, alpha) so that damped oscillations as soon as possible; - 0.4 points

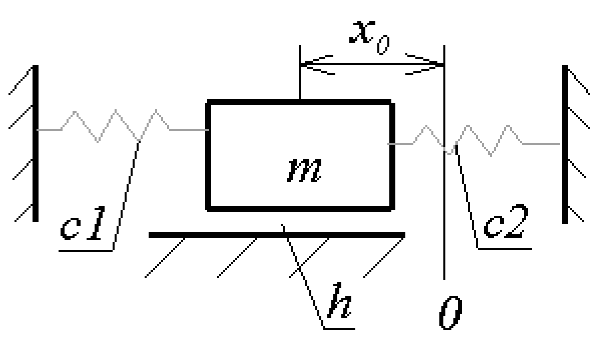
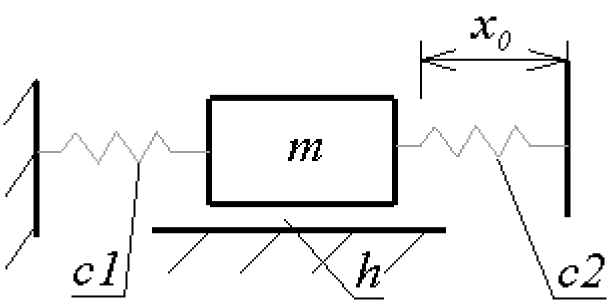
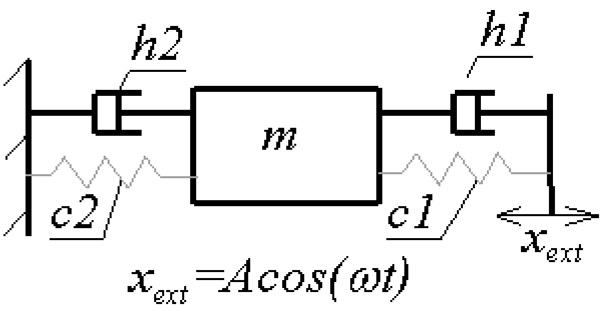
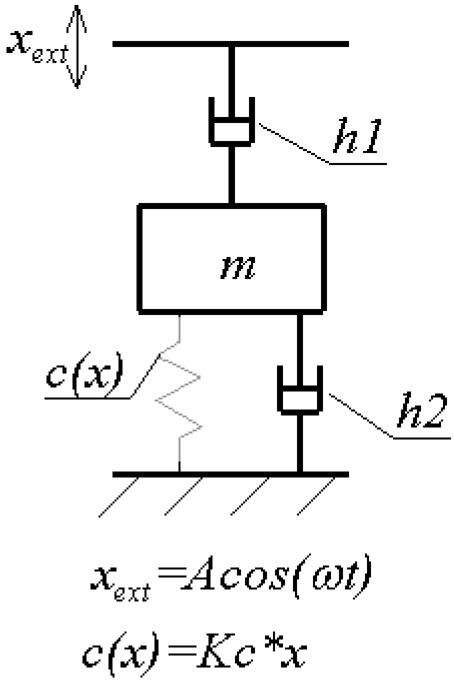
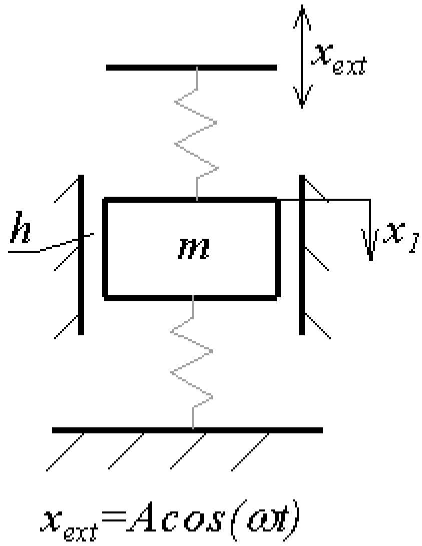
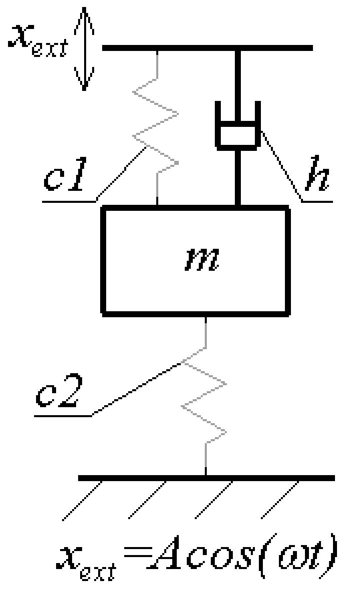
- obtain graphics for each parameter. - 0.4 points

Maximum evaluation are 5 points

Variants of tasks.

1		5	

<table>
<tr>
<td>2</td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>13</td>
<td></td>
</tr>
</table>

10	x_0 m c1 c2 h 0
11	x_0 m c1 c2 h
12	h2 h1 m c2 c1 x_{ext} $x_{ext}=A\cos(\omega t)$
	x_{ext} h1 m c(x) h2 $x_{ext}=A\cos(\omega t)$ $c(x)=Kc*x$
14	x_{ext} h m x_1 $x_{ext}=A\cos(\omega t)$
15	x_{ext} c1 h m c2 $x_{ext}=A\cos(\omega t)$