**ЛАБОРАТОРНАЯ РАБОТА №4**

**по дисциплине:**

**Математические модели объектов и системы управления**

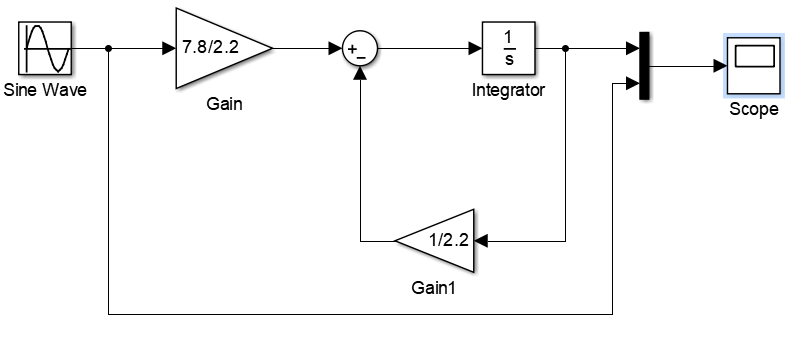
**Вариант 10**

Подготовил: Проверил:

**Цель работы:** экспериментальное определение частотных характеристик систем различного порядка с проверкой значений экспериментальных и теоретических характеристик для заданного интервала частот.

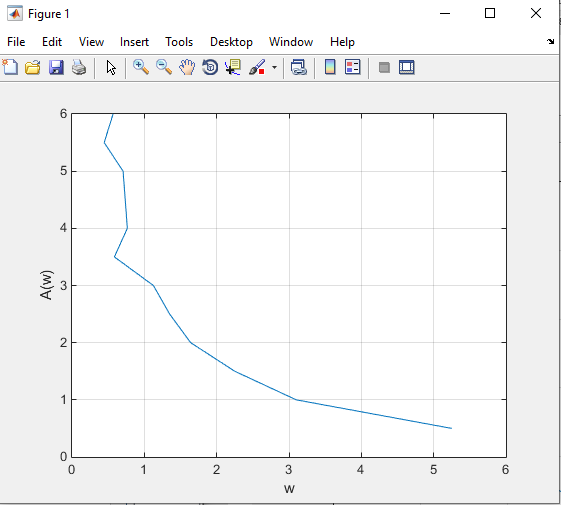
Ход работы

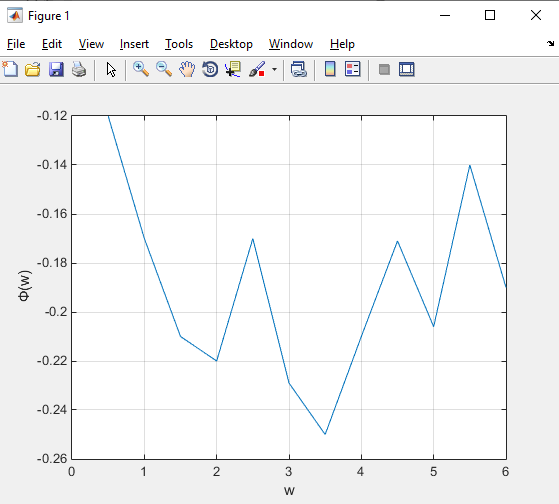
**RC-цепь**

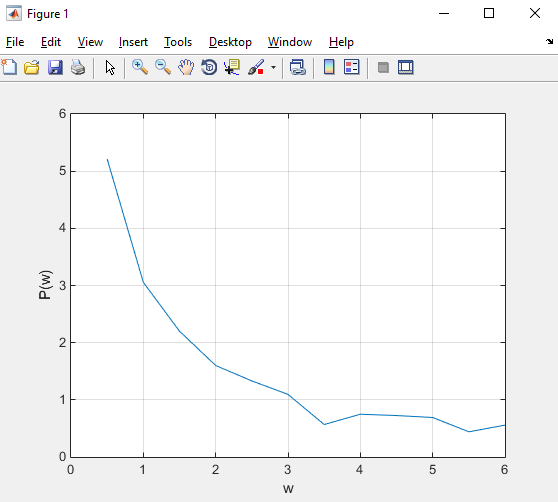


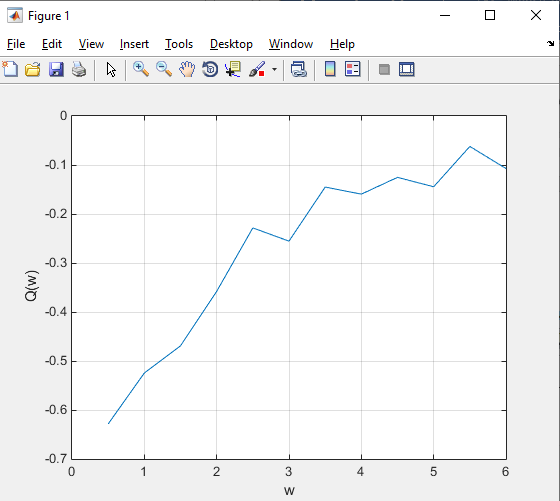
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0.5 | 1 | 1.5 | 2 | 2.5 | 3 | 3.5 | 4 | 4.5 | 5 | 5.5 | 6 |
|  | -1.55 | -1.1 | -0.9 | -0.7 | -0.44 | -0.48 | -0.45 | -0.33 | -0.24 | -0.26 | -0.16 | -0.2 |
| Ym | 5.25 | 3.1 | 2.25 | 1.64 | 1.35 | 1.125 | 0.586 | 0.765 | 0.736 | 0.706 | 0.445 | 0.568 |

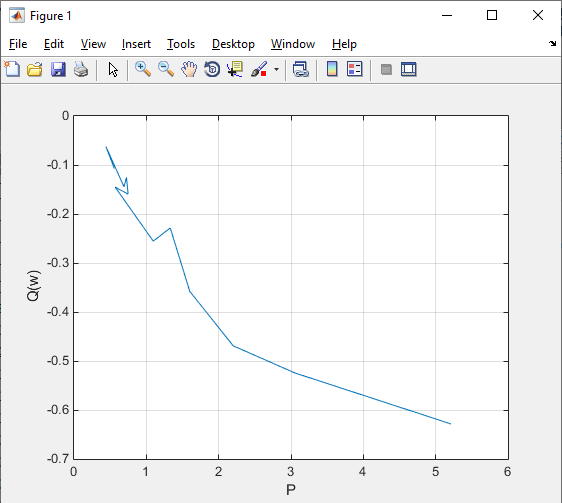
|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Замер |  | A( |  | P( | Q( | W( |
| 1 | 0.5 | 5.25 | -0.12 | 5.212245 | -0.62849 | 5.21-0.62j |
| 2 | 1 | 3.1 | -0.17 | 3.055313 | -0.52447 | 3.05-0.52j |
| 3 | 1.5 | 2.25 | -0.21 | 2.20057 | -0.46903 | 2.20-0.46j |
| 4 | 2 | 1.64 | -0.22 | 1.600472 | -0.3579 | 1.60-0.35j |
| 5 | 2.5 | 1.35 | -0.17 | 1.330539 | -0.2284 | 1.33-0.22j |
| 6 | 3 | 1.125 | -0.229 | 1.095631 | -0.25538 | 1.09-0.25j |
| 7 | 3.5 | 0.586 | -0.25 | 0.567783 | -0.14498 | 0.56-0.14j |
| 8 | 4 | 0.765 | -0.210 | 0.748194 | -0.15947 | 0.74-0.15j |
| 9 | 4.5 | 0.736 | -0.171 | 0.725266 | -0.12524 | 0.72-0.12j |
| 10 | 5 | 0.706 | -0.206 | 0.691073 | -0.14441 | 0.69-0.14j |
| 11 | 5.5 | 0.445 | -0.140 | 0.440646 | -0.0621 | 0.44-0.06j |
| 12 | 6 | 0.568 | -0.190 | 0.557778 | -0.10727 | 0.55-0.10j |



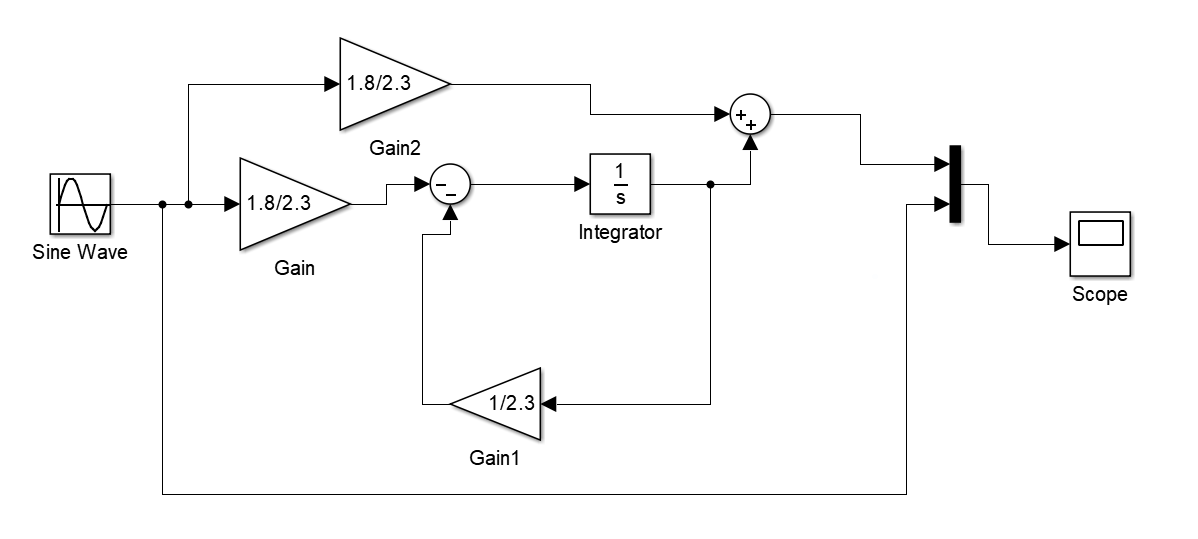






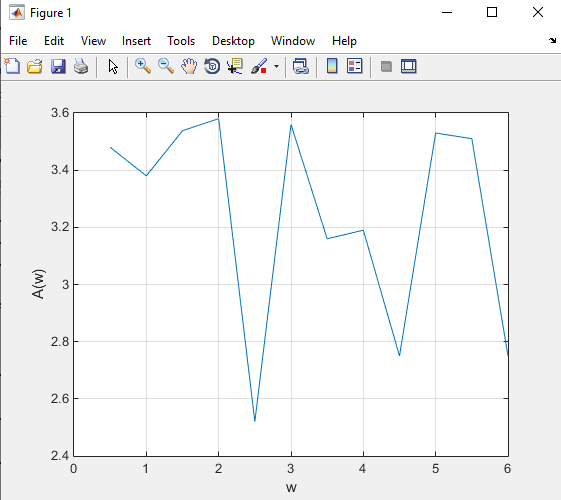


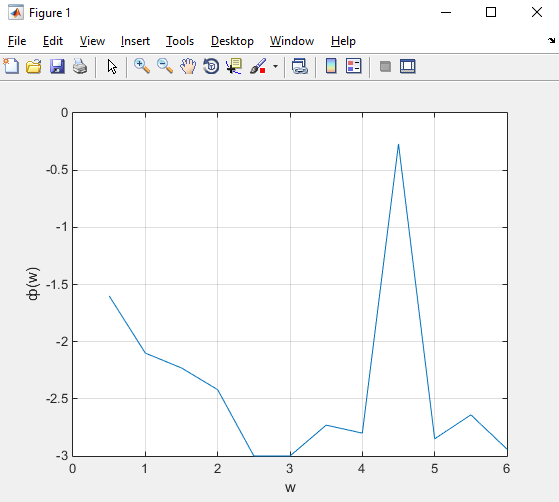
**Дифференцирующая RC-цепь**

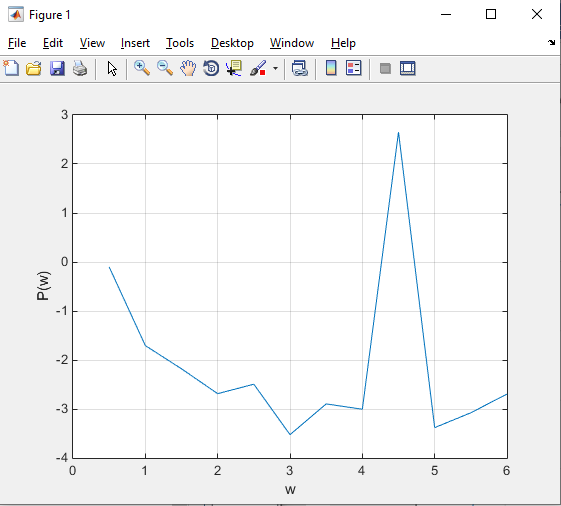


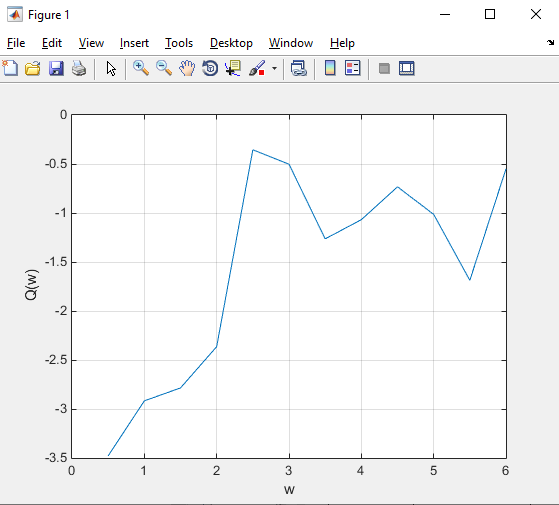
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0.5 | 1 | 1.5 | 2 | 2.5 | 3 | 3.5 | 4 | 4.5 | 5 | 5.5 | 6 |
|  | -3.2 | -2.1 | -1.49 | -1.21 | -1.2 | -1 | -0.78 | -0.7 | -0.06 | -0.57 | -0.48 | -0.49 |
| Ym | 3.48 | 3.38 | 3.538 | 3.58 | 2.52 | 3.56 | 3.16 | 3.19 | 2.75 | 3.53 | 3.51 | 2.75 |

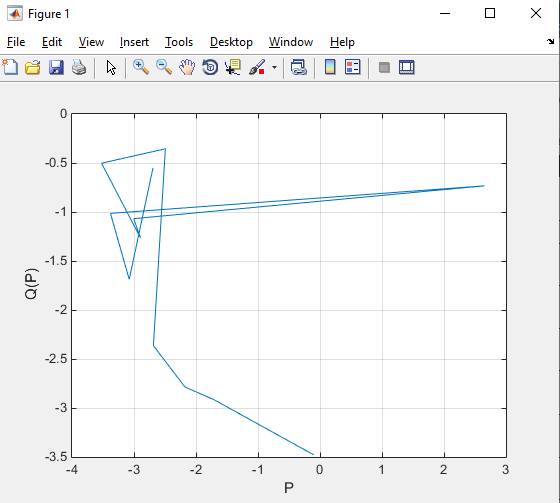
|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Замер |  | A( |  | P( | Q( | W( |
| 1 | 0.5 | 3.48 | -1.60 | -0.101 | -3.478 | -0.101-3.478j |
| 2 | 1 | 3.38 | -2.10 | -1.706 | -2.917 | -1.706-2.917j |
| 3 | 1.5 | 3.538 | -2.23 | -2.180 | -2.785 | -2.180-2.785j |
| 4 | 2 | 3.58 | -2.42 | -2.687 | -2.364 | -2.687-2.364j |
| 5 | 2.5 | 2.52 | -3.00 | -2.494 | -0.355 | -2.494-0.355j |
| 6 | 3 | 3.56 | -3.00 | -3.524 | -0.502 | -3.524-0.502j |
| 7 | 3.5 | 3.16 | -2.73 | -2.896 | -1.264 | -2.896-1.264j |
| 8 | 4 | 3.19 | -2.80 | -3.005 | -1.068 | -3.005-1.068j |
| 9 | 4.5 | 2.75 | -0.27 | 2.6503 | -0.733 | 2.650-0.733j |
| 10 | 5 | 3.53 | -2.85 | -3.380 | -1.014 | -3.380-1.014j |
| 11 | 5.5 | 3.51 | -2.64 | -3.077 | -1.687 | -3.077-1.687j |
| 12 | 6 | 2.75 | -2.94 | -2.694 | -0.550 | -2.694-0.550j |



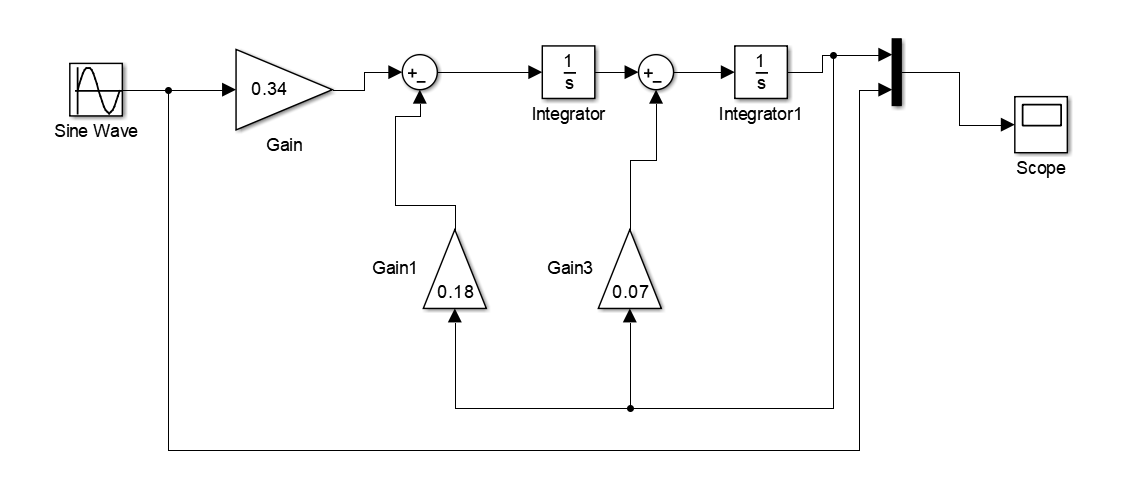








**RLC-цепь**

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|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0.25 | 0.5 | 0.75 | 1 | 1.25 | 1.5 | 1.75 | 2 | 2.25 | 2.5 | 2.75 | 3 |
|  | -0.55 | -0.81 | -1.9 | -2.7 | -2.3 | -1.9 | -1.7 | -1.4 | -1.5 | -1.1 | -1.12 | -1.1 |
| Ym | 8.6 | 11.95 | 20.72 | 9 | 4.4 | 2.63 | 1.77 | 1.33 | 1.02 | 0.67 | 0.52 | 0.48 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Замер |  | A( |  | P( | Q( | W( |
| 1 | 0.25 | 8.6 | -0.138 | 8.519 | -1.179 | 8.519 -1.179j |
| 2 | 0.5 | 11.95 | -0.405 | 10.983 | -4.709 | 10.983-4.709j |
| 3 | 0.75 | 20.72 | -1.425 | 3.010 | -20.500 | 3.010-20.500j |
| 4 | 1 | 9 | -2.700 | -8.137 | -3.846 | -8.137-3.846j |
| 5 | 1.25 | 4.4 | -2.875 | -4.245 | -1.159 | -4.245-1.159j |
| 6 | 1.5 | 2.63 | -2.850 | -2.519 | -0.756 | -2.519-0.756j |
| 7 | 1.75 | 1.77 | -2.975 | -1.745 | -0.294 | -1.745-0.294j |
| 8 | 2 | 1.33 | -2.800 | -1.253 | -0.446 | -1.253-0.446j |
| 9 | 2.25 | 1.02 | -3.375 | -0.992 | 0.236 | -0.992+0.236j |
| 10 | 2.5 | 0.67 | -2.750 | -0.619 | -0.256 | -0.619-0.256j |
| 11 | 2.75 | 0.52 | -3.080 | -0.519 | -0.032 | -0.519-0.032j |
| 12 | 3 | 0.48 | -3.300 | -0.474 | 0.076 | -0.474+0.076j |

