http://cifra.studentmiv.ru/tau-1-1-zadanie/

Задание 1

Передаточная функция линейной САУ

Вывести формулу передаточной функции по заданному дифференциальному уравнению. Написать формулу характеристического уравнения.

Пример решения см. в учебном пособии (есть в библиотеке ЛГТУ):

Музылёва И. В. Теория автоматического управления. Линейные системы [Текст]: методические указания к практическим занятиям / И. В. Музылева, А. А. Муравьев. - Липецк: Изд-во ЛГТУ, 2013. - 79 с.

Варианты задания

№	Дифференциальное уравнение
1	$-33\frac{d^3x_{вых}(t)}{dt^3}+22\frac{d^2x_{вых}(t)}{dt^2}+11\frac{dx_{вых}(t)}{dt}=22\frac{dx_{вх}(t)}{dt}+11x_{вх}(t)$
2	$3\frac{d^4x_{вых}(t)}{dt^4}+9\frac{d^3x_{вых}(t)}{dt^3}+3\frac{d^2x_{вых}(t)}{dt^2}=6\frac{d^2x_{вх}(t)}{dt^2}-9x_{вх}(t)$
3	$3\frac{d^4x_{вых}(t)}{dt^4}+2\frac{d^3x_{вых}(t)}{dt^3}-\frac{dx_{вых}(t)}{dt}+10x_{вых}(t)=\frac{dx_{вх}(t)}{dt}x_{вх}(t)+10x_{вх}(t)$
4	$\frac{d^4x_{вых}(t)}{dt^4}+6\frac{d^2x_{вых}(t)}{dt^2}+\frac{dx_{вых}(t)}{dt}+30x_{вых}(t)=9\frac{d^3x_{вх}(t)}{dt^3}-6\frac{d}{dt}x_{вх}(t)$
5	$14\frac{d^5x_{вых}(t)}{dt^5}+7\frac{d^2x_{вых}(t)}{dt^2}-14\frac{dx_{вых}(t)}{dt}+x_{вых}(t)=7\frac{d^2x_{вх}(t)}{dt^2}+\frac{dx_{вх}(t)}{dt}$
6	$8\frac{d^3x_{вых}(t)}{dt^3}+\frac{d^2x_{вых}(t)}{dt^2}-12\frac{dx_{вых}(t)}{dt}+4x_{вых}(t)=-4\frac{d^3x_{вх}(t)}{dt^3}+0,4x_{вх}(t)$
7	$1,5\frac{d^6x_{вых}(t)}{dt^6}-9\frac{d^3x_{вых}(t)}{dt^3}+1,2\frac{dx_{вых}(t)}{dt}+3x_{вых}(t)=0,6\frac{d^2x_{вх}(t)}{dt^2}$
8	$4\frac{d^4x_{вых}(t)}{dt^4}+0,8\frac{d^2x_{вых}(t)}{dt^2}-\frac{dx_{вых}(t)}{dt}=6\frac{d^2x_{вх}(t)}{dt^2}+0,2\frac{dx_{вх}(t)}{dt}$
9	$66\frac{d^5x_{вых}(t)}{dt^5}-33\frac{d^3x_{вых}(t)}{dt^3}+11\frac{dx_{вых}(t)}{dt}+22x_{вых}(t)=11x_{вх}(t)$
10	$12\frac{d^5x_{вых}(t)}{dt^3}+6\frac{d^2x_{вых}(t)}{dt^2}-12\frac{dx_{вых}(t)}{dt}+1,2x_{вых}(t)=2\frac{d^4x_{вх}(t)}{dt^4}+4x_{вх}(t)$

11	$2\frac{d^3x_{вых}(t)}{dt^3}-7\frac{d^2x_{вых}(t)}{dt^2}-9\frac{dx_{вых}(t)}{dt}+x_{вых}(t)=8\frac{d^2x_{вх}(t)}{dt^2}x_{вх}(t)+x_{вх}(t)$
12	$3\frac{d^4x_{вых}(t)}{dt^4}+1{,}5\frac{d^3x_{вых}(t)}{dt^3}+5\frac{d^2x_{вых}(t)}{dt^2}-\frac{dx_{вых}(t)}{dt}+10x_{вых}(t)=2x_{вх}(t)$
13	$30\frac{d^4x_{вых}(t)}{dt^4}+6\frac{d^3x_{вых}(t)}{dt^3}+3\frac{d^2x_{вых}(t)}{dt^2}-9\frac{dx_{вых}(t)}{dt}+x_{вых}(t)=3\frac{dx_{вх}(t)}{dt}$
14	$1{,}2\frac{d^3x_{вых}(t)}{dt^3}+6\frac{d^2x_{вых}(t)}{dt^2}+3{,}6\frac{dx_{вых}(t)}{dt}+x_{вых}(t)=9\frac{d^2x_{вх}(t)}{dt^2}-3x_{вх}(t)$
15	$-3{,}3\frac{d^4x_{вых}(t)}{dt^4}+2{,}2\frac{d^2x_{вых}(t)}{dt^2}+1{,}1\frac{dx_{вых}(t)}{dt}=2{,}2\frac{dx_{вх}(t)}{dt}+11x_{вх}(t)$
16	$3\frac{d^6x_{вых}(t)}{dt^6}+0{,}9\frac{d^3x_{вых}(t)}{dt^3}+0{,}3\frac{d^2x_{вых}(t)}{dt^2}=0{,}6\frac{d^2x_{вх}(t)}{dt^2}-0{,}3x_{вх}(t)$
17	$50\frac{d^4x_{вых}(t)}{dt^4}+25\frac{d^3x_{вых}(t)}{dt^3}-\frac{dx_{вых}(t)}{dt}+x_{вых}(t)=5\frac{dx_{вх}(t)}{dt}x_{вх}(t)+x_{вх}(t)$
18	$\frac{d^4x_{вых}(t)}{dt^4}+6\frac{d^2x_{вых}(t)}{dt^2}+1{,}2\frac{dx_{вых}(t)}{dt}+3x_{вых}(t)=9\frac{d^3x_{вх}(t)}{dt^3}-6x_{вх}(t)$
19	$4\frac{d^5x_{вых}(t)}{dt^5}+\frac{d^2x_{вых}(t)}{dt^2}-14\frac{d}{dt}x_{вых}(t)+x_{вых}(t)=7\frac{d^2x_{вх}(t)}{dt^2}+21\frac{dx_{вх}(t)}{dt}$
20	$3\frac{d^4x_{вых}(t)}{dt^4}-1{,}5\frac{d^3x_{вых}(t)}{dt^3}+2{,}5\frac{d^2x_{вых}(t)}{dt^2}-\frac{dx_{вых}(t)}{dt}+x_{вых}(t)=2x_{вх}(t)$
21	$30\frac{d^4x_{вых}(t)}{dt^4}+6\frac{d^3x_{вых}(t)}{dt^3}+3\frac{d^2x_{вых}(t)}{dt^2}-9\frac{dx_{вых}(t)}{dt}+x_{вых}(t)=3\frac{dx_{вх}(t)}{dt}$
22	$18\frac{d^3x_{вых}(t)}{dt^3}+6\frac{d^2x_{вых}(t)}{dt^2}+3{,}6\frac{dx_{вых}(t)}{dt}+x_{вых}(t)=5\frac{d^2x_{вх}(t)}{dt^2}-3{,}6x_{вх}(t)$
23	$-3{,}3\frac{d^4x_{вых}(t)}{dt^4}+2{,}2\frac{d^3x_{вых}(t)}{dt^3}+1{,}1\frac{dx_{вых}(t)}{dt}=2{,}2\frac{dx_{вх}(t)}{dt}$
24	$30\frac{d^6x_{вых}(t)}{dt^6}-0{,}9\frac{d^3x_{вых}(t)}{dt^3}+0{,}3\frac{d^2x_{вых}(t)}{dt^2}=6\frac{d^2x_{вх}(t)}{dt^2}-0{,}3x_{вх}(t)$
25	$5\frac{d^4x_{вых}(t)}{dt^4}+25\frac{d^2x_{вых}(t)}{dt^2}-\frac{dx_{вых}(t)}{dt}+5x_{вых}(t)=5\frac{dx_{вх}(t)}{dt}x_{вх}(t)+x_{вх}(t)$
26	$\frac{d^4x_{вых}(t)}{dt^4}+6\frac{d^2x_{вых}(t)}{dt^2}+1{,}2\frac{dx_{вых}(t)}{dt}+3x_{вых}(t)=9\frac{d^2x_{вх}(t)}{dt^2}-6x_{вх}(t)$
27	$3\frac{d^6x_{вых}(t)}{dt^6}-0{,}9\frac{d^4x_{вых}(t)}{dt^4}+0{,}3\frac{d^2x_{вых}(t)}{dt^2}=0{,}6\frac{d^2x_{вх}(t)}{dt^2}-0{,}3x_{вх}(t)$
28	$50\frac{d^4x_{вых}(t)}{dt^4}+25\frac{d^2x_{вых}(t)}{dt^2}-5\frac{dx_{вых}(t)}{dt}+10x_{вых}(t)=5\frac{dx_{вх}(t)}{dt}+x_{вх}(t)$
29	$5\frac{d^5x_{вых}(t)}{dt^5}-33\frac{d^3x_{вых}(t)}{dt^3}+1{,}1\frac{dx_{вых}(t)}{dt}+x_{вых}(t)=44\frac{d^3x_{вх}(t)}{dt^3}+11x_{вх}(t)$

30	$12\frac{d^5x_{вых}(t)}{dt^3}+6\frac{d^2x_{вых}(t)}{dt^2}-12\frac{dx_{вых}(t)}{dt}+1,2x_{вых}(t)=\frac{d^4x_{вх}(t)}{dt^4}+x_{вх}(t)$
31	$2\frac{d^3x_{вых}(t)}{dt^3}-\frac{d^2x_{вых}(t)}{dt^2}-9\frac{dx_{вых}(t)}{dt}+x_{вых}(t)=-\frac{d^2x_{вх}(t)}{dt^2}x_{вх}(t)+4x_{вх}(t)$
32	$30\frac{d^5x_{вых}(t)}{dt^5}+1,5\frac{d^3x_{вых}(t)}{dt^3}+25\frac{d^2x_{вых}(t)}{dt^2}-\frac{dx_{вых}(t)}{dt}+x_{вых}(t)=2x_{вх}(t)$
33	$30\frac{d^4x_{вых}(t)}{dt^4}+6\frac{d^3x_{вых}(t)}{dt^3}+3\frac{d^2x_{вых}(t)}{dt^2}-9\frac{dx_{вых}(t)}{dt}+x_{вых}(t)=3\frac{dx_{вх}(t)}{dt}$
34	$9\frac{d^4x_{вых}(t)}{dt^4}+6\frac{d^2x_{вых}(t)}{dt^2}+36\frac{dx_{вых}(t)}{dt}+0,9x_{вых}(t)=9\frac{d^2x_{вх}(t)}{dt^2}-3x_{вх}(t)$
35	$-33\frac{d^3x_{вых}(t)}{dt^3}+22\frac{d^2x_{вых}(t)}{dt^2}+11\frac{dx_{вых}(t)}{dt}=77\frac{dx_{вх}(t)}{dt}+11x_{вх}(t)$
36	$0,3\frac{d^6x_{вых}(t)}{dt^6}+9\frac{d^3x_{вых}(t)}{dt^3}+0,3\frac{d^2x_{вых}(t)}{dt^2}=6\frac{d^2x_{вх}(t)}{dt^2}-0,3x_{вх}(t)$
37	$5\frac{d^4x_{вых}(t)}{dt^4}+250\frac{d^3x_{вых}(t)}{dt^3}-\frac{dx_{вых}(t)}{dt}+x_{вых}(t)=5\frac{dx_{вх}(t)}{dt}x_{вх}(t)+x_{вх}(t)$
38	$12\frac{d^4x_{вых}(t)}{dt^4}+6\frac{d^2x_{вых}(t)}{dt^2}+12\frac{dx_{вых}(t)}{dt}+3x_{вых}(t)=24\frac{d^3x_{вх}(t)}{dt^3}-6x_{вх}(t)$
39	$1,4\frac{d^5x_{вых}(t)}{dt^5}+7\frac{d^2x_{вых}(t)}{dt^2}-14\frac{d}{dt}x_{вых}(t)+7x_{вых}(t)=-2,1\frac{dx_{вх}(t)}{dt}$
40	$3\frac{d^4x_{вых}(t)}{dt^4}-1,5\frac{d^3x_{вых}(t)}{dt^3}+5\frac{d^2x_{вых}(t)}{dt^2}-\frac{dx_{вых}(t)}{dt}+100x_{вых}(t)=2x_{вх}(t)$