

## Уравнение Лагранжа. Определение ускорения

Дано выражение кинетической энергии и обобщенной силы механической системы с одной степенью свободы. В некоторый момент известны значения обобщенной координаты  $x$  и скорости  $\dot{x}$ . Найти ускорение  $\ddot{x}$ .

### Задача 32.1.

6

$$T = \dot{x}^2(1 + 2 \cos x + 9 \sin^2 x)$$

$$Q = 5, x = 0, \dot{x} = 3.$$

### Задача 32.2.

6

$$T = \dot{x}^2(1 + 9 \sin 2x + 7 \sin^2 x)$$

$$Q = 8, x = 0, \dot{x} = 2.$$

### Задача 32.3.

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$$T = \dot{x}^2(5 + 3 \cos^2 x + 9 \sin x)$$

$$Q = 1, x = 3, \dot{x} = 9.$$

### Задача 32.4.

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$$T = \dot{x}^2(6 + 3 \sin 2x + 4 \sin^2 x)$$

$$Q = 2, x = 3, \dot{x} = 2.$$

### Задача 32.5.

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$$T = \dot{x}^2(2 + 8 \sin 2x + 10 \cos^2 x)$$

$$Q = 8, x = 1, \dot{x} = 6.$$

### Задача 32.6.

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$$T = \dot{x}^2(2 + 4 \cos^2 x + 5 \sin^2 x)$$

$$Q = 4, x = 1, \dot{x} = 1.$$

### Задача 32.7.

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$$T = \dot{x}^2(8 + 5 \sin 2x + 6 \sin x)$$

$$Q = 7, x = 6, \dot{x} = 5.$$

### Задача 32.8.

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$$T = \dot{x}^2(7 + 10 \sin^2 x + 8 \cos^2 x)$$

$$Q = 7, x = 6, \dot{x} = 2.$$

### Задача 32.9.

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$$T = \dot{x}^2(5 + 4 \sin^2 x + 3 \sin x)$$

$$Q = 6, x = 3, \dot{x} = 2.$$

### Задача 32.10.

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$$T = \dot{x}^2(9 + 9 \cos^2 x + 8 \sin 2x)$$

$$Q = 4, x = 6, \dot{x} = 4.$$

### Задача 32.11.

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$$T = \dot{x}^2(4 + 9 \cos x + 3 \sin 2x)$$

$$Q = 9, x = 2, \dot{x} = 5.$$

### Задача 32.12.

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$$T = \dot{x}^2(8 + 5 \sin^2 x + 2 \cos^2 x)$$

$$Q = 2, x = 7, \dot{x} = 6.$$

### Задача 32.13.

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$$T = \dot{x}^2(5 + 10 \sin x + 10 \sin 2x)$$

$$Q = 8, x = 2, \dot{x} = 8.$$

### Задача 32.14.

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$$T = \dot{x}^2(6 + 9 \cos^2 x + 8 \sin 2x)$$

$$Q = 8, x = 3, \dot{x} = 4.$$

**Задача 32.15.**

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$$T = \dot{x}^2(6 + 6 \sin x + 5 \cos x)$$

$$Q = 3, x = 4, \dot{x} = 2.$$

**Задача 32.16.**

6

$$T = \dot{x}^2(6 + 8 \sin 2x + 10 \sin^2 x)$$

$$Q = 9, x = 5, \dot{x} = 4.$$

**Задача 32.17.**

6

$$T = \dot{x}^2(8 + 7 \sin 2x + 6 \sin^2 x)$$

$$Q = 4, x = 5, \dot{x} = 3.$$

**Задача 32.18.**

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$$T = \dot{x}^2(4 + 10 \sin^2 x + 5 \cos^2 x)$$

$$Q = 9, x = 3, \dot{x} = 8.$$

**Задача 32.19.**

6

$$T = \dot{x}^2(9 + 2 \sin^2 x + 7 \sin 2x)$$

$$Q = 9, x = 6, \dot{x} = 6.$$

**Задача 32.20.**

6

$$T = \dot{x}^2(7 + 9 \sin 2x + 5 \cos^2 x)$$

$$Q = 5, x = 6, \dot{x} = 5.$$

**Задача 32.21.**

6

$$T = \dot{x}^2(3 + 4 \sin 2x + 5 \cos^2 x)$$

$$Q = 9, x = 2, \dot{x} = 4.$$

**Задача 32.22.**

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$$T = \dot{x}^2(6 + 5 \sin 2x + 5 \cos x)$$

$$Q = 3, x = 4, \dot{x} = 7.$$

**Задача 32.23.**

6

$$T = \dot{x}^2(5 + 8 \cos x + 4 \sin^2 x)$$

$$Q = 2, x = 4, \dot{x} = 5.$$

**Задача 32.24.**

6

$$T = \dot{x}^2(8 + 4 \sin^2 x + 9 \cos^2 x)$$

$$Q = 3, x = 7, \dot{x} = 1.$$

**Задача 32.25.**

6

$$T = \dot{x}^2(5 + 2 \sin 2x + 4 \sin^2 x)$$

$$Q = 9, x = 2, \dot{x} = 5.$$

**Задача 32.26.**

6

$$T = \dot{x}^2(3 + 9 \sin x + 7 \cos x)$$

$$Q = 7, x = 1, \dot{x} = 7.$$

**Задача 32.27.**

6

$$T = \dot{x}^2(1 + 4 \cos x + 6 \sin 2x)$$

$$Q = 8, x = -1, \dot{x} = 5.$$

**Задача 32.28.**

6

$$T = \dot{x}^2(8 + 6 \cos^2 x + 7 \sin^2 x)$$

$$Q = 3, x = 7, \dot{x} = 6.$$

**Задача 32.29.**

6

$$T = \dot{x}^2(7 + 3 \cos x + 8 \sin x)$$

$$Q = 5, x = 5, \dot{x} = 3.$$

**Задача 32.30.**

6

$$T = \dot{x}^2(2 + 2 \sin x + 10 \cos x)$$

$$Q = 5, x = 0, \dot{x} = 8.$$

**Уравнение Лагранжа. Определение ускорения**

1	0.833
2	-32.000
3	35.547
4	-1.581
5	23.580
6	0.230
7	-47.792
8	0.373
9	2.031
10	-11.123
11	-77.302
12	-4.647
13	85.135
14	-11.046
15	-0.982
16	14.334
17	7.163
18	5.408
19	-34.968
20	-32.579
21	19.150
22	-7.236
23	-60.212
24	0.268
25	11.043
26	1.998
27	-10.611
28	-1.132
29	-115.023
30	-5.125