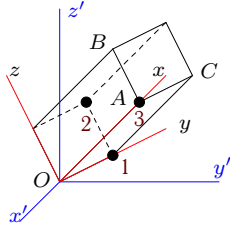


Сферическое движение. Кинетическая энергия

Движение прямоугольного параллелепипеда массой m_0 вокруг точки, закрепленной в начале координат, задано углами Эйлера. В вершинах параллелепипеда закреплены три точки с массами m_1 , m_2 и m_3 . Найти кинетическую энергию системы при $t = 0$. Массы даны в килограммах, размеры — в метрах.

Задача D39.1.

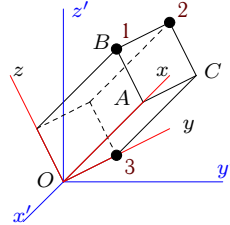
2



$AB = AC = 2, OA = 6,$
 $m_0 = 48, m_1 = m_2 = 3, m_3 = 2,$
 $\varphi = 4\sqrt{2}t + \pi/4, \psi = \pi, \theta = -4t + \pi/3.$

Задача D39.2.

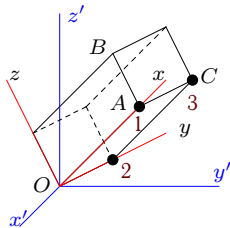
2



$AB = AC = 3, OA = 6,$
 $m_0 = 60, m_1 = 3, m_2 = 4, m_3 = 3,$
 $\varphi = 4t + \pi/4, \psi = 6t, \theta = 2\sqrt{2}t.$

Задача D39.3.

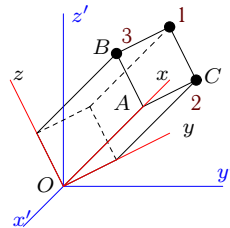
2



$AB = AC = 2, OA = 3,$
 $m_0 = 36, m_1 = 1, m_2 = 5, m_3 = 2,$
 $\varphi = 4t, \psi = 4\sqrt{2}t, \theta = \pi/4.$

Задача D39.4.

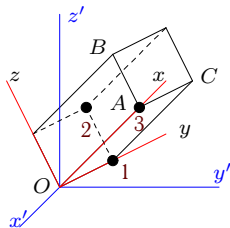
2



$AB = AC = 2, OA = 6,$
 $m_0 = 48, m_1 = 3, m_2 = 5, m_3 = 2,$
 $\varphi = 4t, \psi = -2t + \pi/8, \theta = \pi/2.$

Задача D39.5.

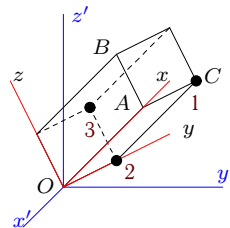
2



$AB = 2, AC = 1, OA = 3,$
 $m_0 = 24, m_1 = 1, m_2 = 5, m_3 = 1,$
 $\varphi = 4t, \psi = -4t + \pi/2, \theta = \pi/2.$

Задача D39.6.

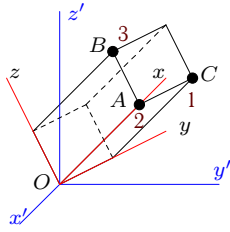
2



$AB = 1, AC = 2, OA = 5,$
 $m_0 = 36, m_1 = 2, m_2 = 6, m_3 = 1,$
 $\varphi = 4t + \pi/4, \psi = 4t, \theta = 4\sqrt{2}t.$

Задача D39.7.

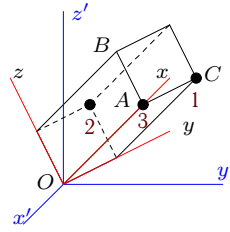
2



$AB = AC = 3, OA = 6,$
 $m_0 = 48, m_1 = 3, m_2 = 4, m_3 = 3,$
 $\varphi = 4t, \psi = 2t + \pi/6, \theta = \pi/2.$

Задача D39.8.

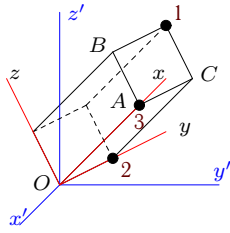
2



$AB = AC = 3, OA = 6,$
 $m_0 = 48, m_1 = m_2 = 3, m_3 = 2,$
 $\varphi = 4t + \pi/4, \psi = -4t, \theta = 4\sqrt{2}t.$

Задача D39.9.

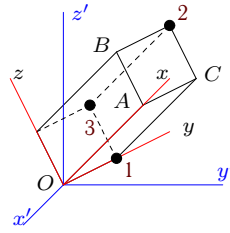
2



$AB = AC = 2, OA = 5,$
 $m_0 = 48, m_1 = 3, m_2 = 6, m_3 = 1,$
 $\varphi = 8t + \pi/2, \psi = \pi/6, \theta = -2t + \pi/3.$

Задача D39.10.

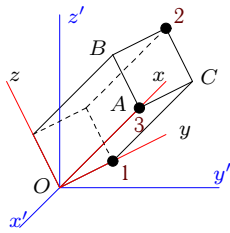
2



$AB = 2, AC = 1, OA = 3,$
 $m_0 = 24, m_1 = 1, m_2 = 4, m_3 = 2,$
 $\varphi = 4t + \pi/4, \psi = 6t, \theta = 2\sqrt{2}t.$

Задача D39.11.

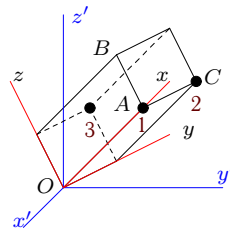
2



$AB = 3, AC = 2, OA = 6,$
 $m_0 = 24, m_1 = 2, m_2 = 5, m_3 = 3,$
 $\varphi = -4t, \psi = 6\sqrt{2}t, \theta = \pi/4.$

Задача D39.12.

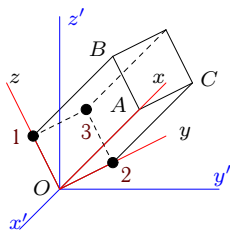
2



$AB = 2, AC = 3, OA = 4,$
 $m_0 = 60, m_1 = 2, m_2 = 5, m_3 = 3,$
 $\varphi = 8t + \pi/2, \psi = \pi/2, \theta = 2t + \pi/3.$

Задача D39.13.

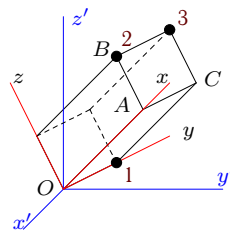
2



$AB = AC = 2, OA = 3,$
 $m_0 = 36, m_1 = 2, m_2 = 3, m_3 = 2,$
 $\varphi = 4t, \psi = 2t + \pi/4, \theta = \pi/2.$

Задача D39.14.

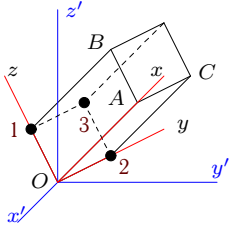
2



$AB = 1, AC = 2, OA = 3,$
 $m_0 = 48, m_1 = 2, m_2 = 5, m_3 = 2,$
 $\varphi = 12t + \pi/2, \psi = \pi/2, \theta = -2t + \pi/3.$

Задача D39.15.

2



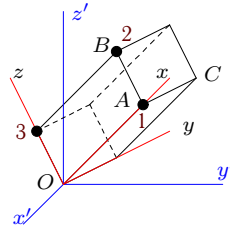
$$AB = AC = 2, OA = 4,$$

$$m_0 = 24, m_1 = 1, m_2 = 3, m_3 = 3,$$

$$\varphi = 2t, \psi = 2\sqrt{2}t, \theta = \pi/4.$$

Задача D39.16.

2



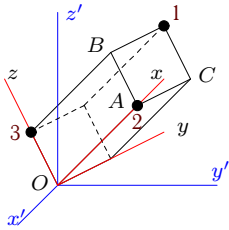
$$AB = 1, AC = 2, OA = 3,$$

$$m_0 = 36, m_1 = m_2 = 2, m_3 = 1,$$

$$\varphi = 6\sqrt{2}t + \pi/4, \psi = \pi/6, \theta = -2t + \pi/3.$$

Задача D39.17.

2



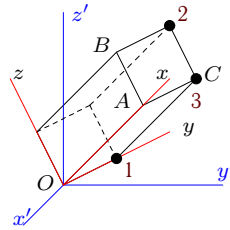
$$AB = 1, AC = 2, OA = 3,$$

$$m_0 = 24, m_1 = 1, m_2 = 2, m_3 = 1,$$

$$\varphi = 4t, \psi = -2t + \pi/3, \theta = \pi/2.$$

Задача D39.18.

2



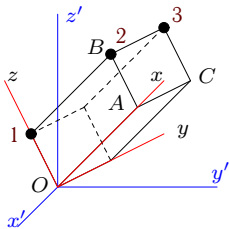
$$AB = AC = 1, OA = 5,$$

$$m_0 = 12, m_1 = 2, m_2 = 4, m_3 = 1,$$

$$\varphi = 6\sqrt{2}t + \pi/4, \psi = \pi/2, \theta = -2t + \pi/3.$$

Задача D39.19.

2



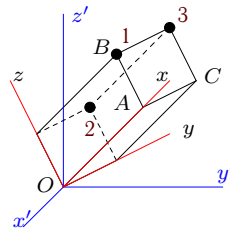
$$AB = 2, AC = 1, OA = 3,$$

$$m_0 = 24, m_1 = 1, m_2 = 5, m_3 = 1,$$

$$\varphi = 2t, \psi = 2t + \pi/3, \theta = \pi/2.$$

Задача D39.20.

2



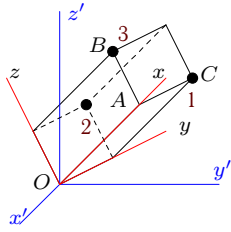
$$AB = AC = 1, OA = 3,$$

$$m_0 = 24, m_1 = 1, m_2 = 3, m_3 = 1,$$

$$\varphi = 2t, \psi = 4t + \pi/8, \theta = \pi/2.$$

Задача D39.21.

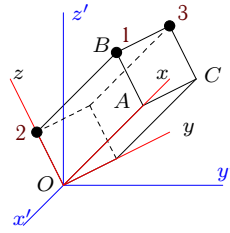
2



$AB = 2, AC = 1, OA = 3,$
 $m_0 = 12, m_1 = 1, m_2 = 6, m_3 = 2,$
 $\varphi = 4\sqrt{2}t + \pi/4, \psi = \pi/3, \theta = -4t + \pi/3.$

Задача D39.22.

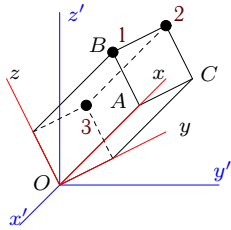
2



$AB = AC = 2, OA = 4,$
 $m_0 = 24, m_1 = 1, m_2 = 5, m_3 = 2,$
 $\varphi = 4t + \pi/2, \psi = \pi/4, \theta = 4t + \pi/3.$

Задача D39.23.

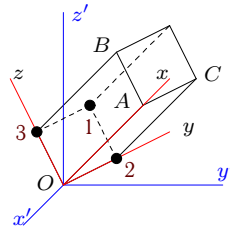
2



$AB = AC = 2, OA = 3,$
 $m_0 = 24, m_1 = 1, m_2 = 5, m_3 = 1,$
 $\varphi = 2\sqrt{2}t + \pi/4, \psi = \pi, \theta = 4t + \pi/3.$

Задача D39.24.

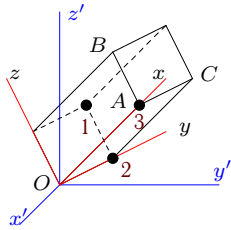
2



$AB = 3, AC = 2, OA = 6,$
 $m_0 = 48, m_1 = 3, m_2 = 5, m_3 = 2,$
 $\varphi = 2t + \pi/4, \psi = 4t, \theta = 4\sqrt{2}t.$

Задача D39.25.

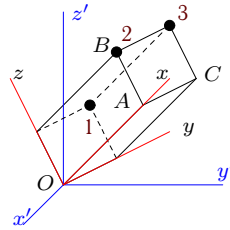
2



$AB = 1, AC = 2, OA = 3,$
 $m_0 = 48, m_1 = 2, m_2 = 6, m_3 = 1,$
 $\varphi = 2\sqrt{2}t + \pi/4, \psi = \pi/3, \theta = 4t + \pi/3.$

Задача D39.26.

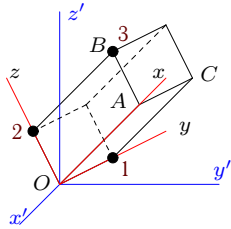
2



$AB = AC = 3, OA = 4,$
 $m_0 = 60, m_1 = 2, m_2 = 5, m_3 = 3,$
 $\varphi = 4t + \pi/4, \psi = 10t, \theta = -4\sqrt{2}t.$

Задача D39.27.

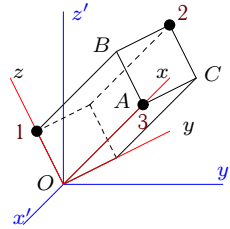
2



$AB = AC = 2, OA = 6,$
 $m_0 = 48, m_1 = 3, m_2 = 6, m_3 = 2,$
 $\varphi = 4\sqrt{2}t + \pi/4, \psi = \pi/4, \theta = 2t + \pi/3.$

Задача D39.28.

2



$AB = 1, AC = 3, OA = 3,$
 $m_0 = 48, m_1 = 2, m_2 = 5, m_3 = 1,$
 $\varphi = 8t + \pi/2, \psi = \pi, \theta = 4t + \pi/3.$

Д39 Ответы.**Сферическое движение. Кинетическая энергия**

03.10.2012

№	ω_x	ω_y	ω_z	J_x	J_y	J_z	J_{xy}	J_{xz}	J_{yz}	J_{x0}	J_{y0}	J_{z0}	J_{xy0}	J_{xz0}	J_{yz0}	T
1	-2.83	2.83	5.66	164	724	736	144	144	60	128	640	640	144	144	48	17824.0
2	2.00	-2.00	10.00	486	1215	1215	342	396	171	360	900	900	270	270	135	61020.0
3	0.00	4.00	8.00	124	183	211	66	54	36	96	156	156	54	54	36	7064.0
4	0.00	-2.00	4.00	180	1020	1032	240	204	60	128	640	640	144	144	48	10776.0
5	0.00	-4.00	4.00	66	133	95	18	36	22	40	104	80	18	36	12	2176.0
6	4.00	-4.00	8.00	97	363	434	110	45	20	60	312	348	90	45	18	18528.0
7	0.00	2.00	4.00	342	1107	1107	270	270	108	288	720	720	216	216	108	10206.0
8	4.00	-4.00	0.00	369	927	954	270	216	135	288	720	720	216	216	108	14688.0
9	-0.00	2.00	8.00	176	576	600	150	150	60	128	464	464	120	120	48	19392.0
10	2.00	-2.00	10.00	71	164	123	30	60	24	40	104	80	18	36	12	6020.0
11	0.00	6.00	2.00	177	693	636	132	198	66	104	360	320	72	108	36	12954.0
12	0.00	-2.00	8.00	344	524	684	240	120	108	260	400	500	180	120	90	24664.0
13	0.00	2.00	4.00	132	172	176	54	54	44	96	156	156	54	54	36	1400.0
14	-0.00	2.00	12.00	103	230	287	84	57	28	80	160	208	72	36	24	20452.0
15	0.00	2.00	4.00	104	176	184	48	48	36	64	160	160	48	48	24	1536.0
16	-1.41	1.41	8.49	63	159	192	54	33	18	60	120	156	54	27	18	7422.0
17	0.00	-2.00	4.00	46	109	135	42	21	14	40	80	104	36	18	12	1410.0
18	-1.41	1.41	8.49	19	233	236	40	35	7	8	104	104	15	15	3	9164.0
19	0.00	2.00	2.00	69	186	135	21	72	14	40	104	80	18	36	12	586.0
20	0.00	4.00	2.00	25	103	102	21	24	10	16	80	80	18	18	6	948.0
21	-2.83	2.83	5.66	59	111	74	12	30	18	20	52	40	9	18	6	2152.0
22	0.00	-4.00	4.00	104	240	216	64	72	32	64	160	160	48	48	24	4160.0
23	2.83	-2.83	2.83	116	186	182	66	72	48	64	104	104	36	36	24	2272.0
24	4.00	-4.00	6.00	285	765	672	144	216	90	208	720	640	144	216	72	19776.0
25	2.83	-2.83	2.83	114	171	249	72	36	28	80	160	208	72	36	24	2648.0
26	-4.00	4.00	14.00	495	718	673	216	276	180	360	500	500	180	180	135	84490.0
27	1.41	-1.41	5.66	172	744	724	144	168	48	128	640	640	144	144	48	11828.0
28	0.00	-4.00	8.00	212	221	387	153	51	51	160	160	288	108	36	36	15784.0
29	-0.00	4.00	8.00	53	160	117	16	48	8	20	80	68	12	24	6	4768.0
30	1.41	-1.41	2.83	331	788	943	300	150	102	260	580	680	225	150	90	5299.0
31	0.00	2.00	4.00	215	639	584	132	162	54	156	540	480	108	162	54	5518.0
32	-0.00	4.00	12.00	286	1098	988	180	324	72	208	720	640	144	216	72	76464.0
33	2.00	-2.00	6.00	297	529	376	96	180	72	208	400	320	96	144	72	7508.0
34	0.00	4.00	2.00	27	70	65	12	18	6	20	52	40	9	18	6	642.0

Д39 файл о39d2A