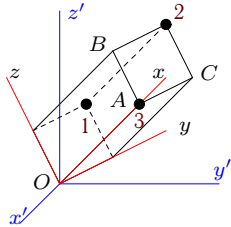


Сферическое движение. Кинетическая энергия

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.

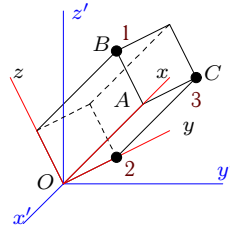
4



$$AB = 3, AC = 2, OA = 6, \\ m_0 = 36, m_1 = 2, m_2 = 5, m_3 = 3, \\ \varphi = 4t + \pi/4, \psi = 6t, \theta = 2\sqrt{2}t.$$

Задача D39.2.

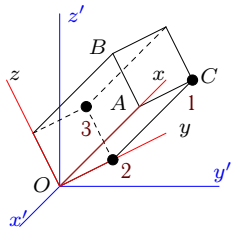
4



$$AB = 3, AC = 2, OA = 6, \\ m_0 = 24, m_1 = 2, m_2 = 3, m_3 = 2, \\ \varphi = 2t, \psi = 4t + \pi/8, \theta = \pi/2.$$

Задача D39.3.

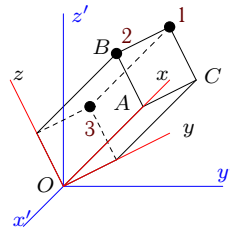
4



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

Задача D39.4.

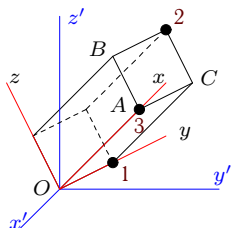
4



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

Задача D39.5.

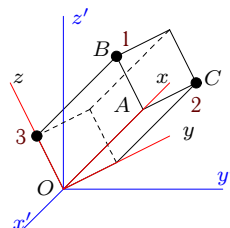
4



$$AB = 2, AC = 1, OA = 5, \\ m_0 = 12, m_1 = 2, m_2 = 6, m_3 = 2, \\ \varphi = 4\sqrt{2}t + \pi/4, \psi = \pi/3, \theta = 2t + \pi/3.$$

Задача D39.6.

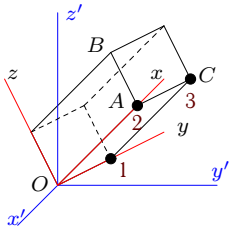
4



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

Задача D39.7.

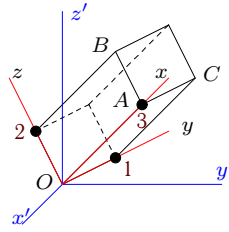
4



$AB = AC = 2, OA = 3,$
 $m_0 = 24, m_1 = 1, m_2 = 3, m_3 = 1,$
 $\varphi = 8t + \pi/2, \psi = \pi/6, \theta = 4t + \pi/3.$

Задача D39.8.

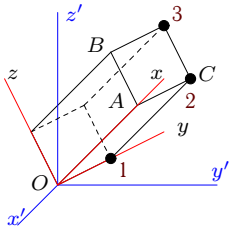
4



$AB = 2, AC = 3, OA = 6,$
 $m_0 = 60, m_1 = 3, m_2 = 5, m_3 = 2,$
 $\varphi = 6\sqrt{2}t + \pi/4, \psi = \pi/6, \theta = -2t + \pi/3.$

Задача D39.9.

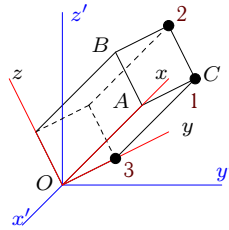
4



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

Задача D39.10.

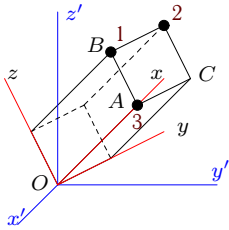
4



$AB = 2, AC = 1, OA = 3,$
 $m_0 = 24, m_1 = 1, m_2 = 5, m_3 = 1,$
 $\varphi = 12t + \pi/2, \psi = \pi/2, \theta = -2t + \pi/3.$

Задача D39.11.

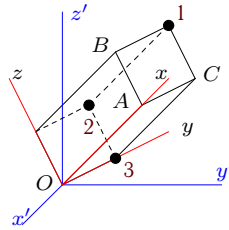
4



$AB = AC = 2, OA = 3,$
 $m_0 = 48, m_1 = 2, m_2 = 5, m_3 = 1,$
 $\varphi = 2t, \psi = 4t + \pi/6, \theta = \pi/2.$

Задача D39.12.

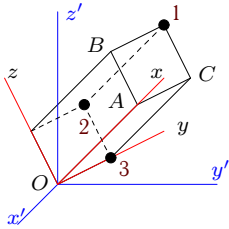
4



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

Задача D39.13.

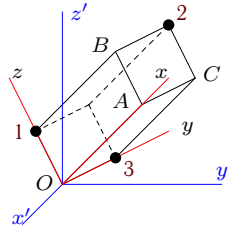
4



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

Задача D39.14.

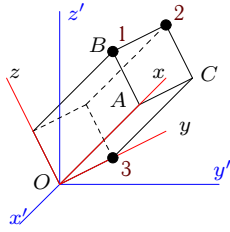
4



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

Задача D39.15.

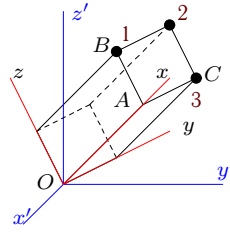
4



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

Задача D39.16.

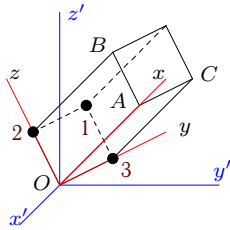
4



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

Задача D39.17.

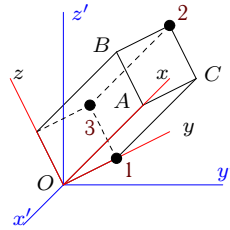
4



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

Задача D39.18.

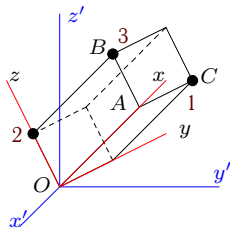
4



$AB = 1, AC = 2, OA = 5,$
 $m_0 = 48, m_1 = 3, m_2 = 4, m_3 = 1,$
 $\varphi = 6\sqrt{2}t + \pi/4, \psi = \pi/8, \theta = -2t + \pi/3.$

Задача D39.19.

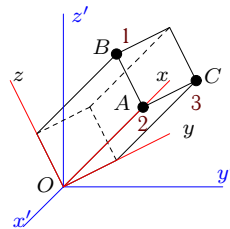
4



$AB = AC = 2, OA = 3,$
 $m_0 = 36, m_1 = 2, m_2 = 6, m_3 = 1,$
 $\varphi = 4t + \pi/4, \psi = 6t, \theta = -4\sqrt{2}t.$

Задача D39.20.

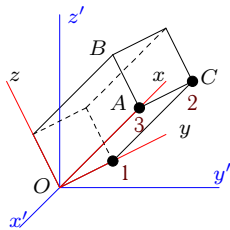
4



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

Задача D39.21.

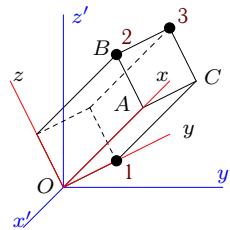
4



$AB = 2, AC = 1, OA = 5,$
 $m_0 = 24, m_1 = 2, m_2 = 7, m_3 = 1,$
 $\varphi = 4t, \psi = -4t + \pi/2, \theta = \pi/2.$

Задача D39.22.

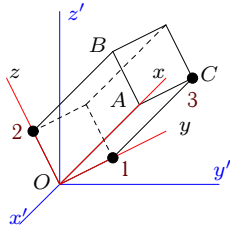
4



$AB = 1, AC = 2, OA = 5,$
 $m_0 = 36, m_1 = 2, m_2 = 4, m_3 = 1,$
 $\varphi = 6\sqrt{2}t + \pi/4, \psi = \pi/3, \theta = -4t + \pi/3.$

Задача D39.23.

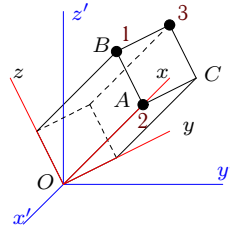
4



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

Задача D39.24.

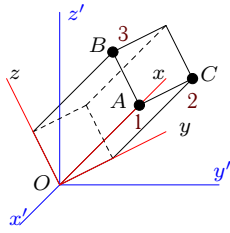
4



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

Задача D39.25.

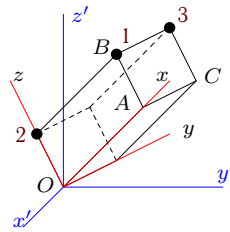
4



$AB = 3, AC = 2, OA = 6,$
 $m_0 = 36, m_1 = 2, m_2 = 6, m_3 = 2,$
 $\varphi = 6\sqrt{2}t + \pi/4, \psi = \pi/6, \theta = -2t + \pi/3.$

Задача D39.26.

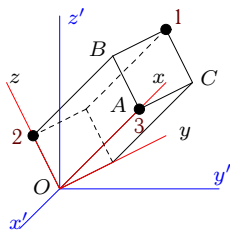
4



$AB = AC = 3, OA = 6,$
 $m_0 = 60, m_1 = 3, m_2 = 7, m_3 = 2,$
 $\varphi = 8t + \pi/2, \psi = \pi, \theta = 2t + \pi/3.$

Задача D39.27.

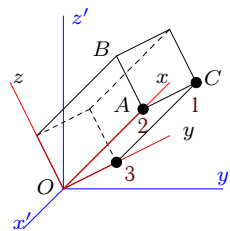
4



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

Задача D39.28.

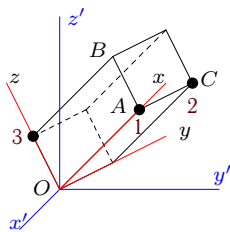
4



$AB = 1, AC = 3, OA = 5,$
 $m_0 = 60, m_1 = 3, m_2 = 5, m_3 = 2,$
 $\varphi = 4t, \psi = -4t + \pi, \theta = \pi/2.$

Задача D39.29.

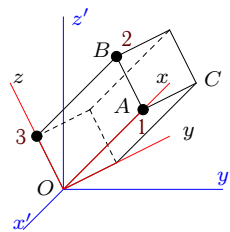
4



$AB = AC = 2, OA = 6,$
 $m_0 = 36, m_1 = 3, m_2 = 4, m_3 = 3,$
 $\varphi = 2t + \pi/4, \psi = 4t, \theta = 2\sqrt{2}t.$

Задача D39.30.

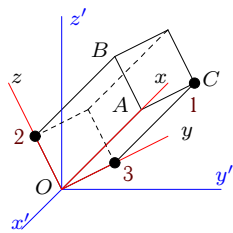
4



$AB = 1, AC = 2, OA = 3,$
 $m_0 = 36, m_1 = 2, m_2 = 4, m_3 = 2,$
 $\varphi = 12t + \pi/2, \psi = \pi, \theta = -4t + \pi/3.$

Задача D39.31.

4



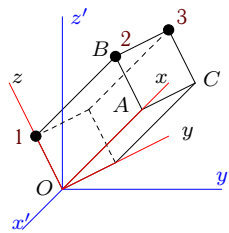
$$AB = 3, AC = 1, OA = 4,$$

$$m_0 = 24, m_1 = 1, m_2 = 7, m_3 = 2,$$

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

Задача D39.32.

4



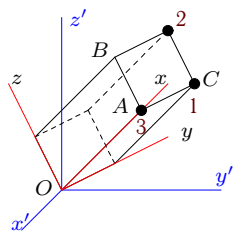
$$AB = 3, AC = 2, OA = 6,$$

$$m_0 = 24, m_1 = 2, m_2 = 5, m_3 = 2,$$

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

Задача D39.33.

4



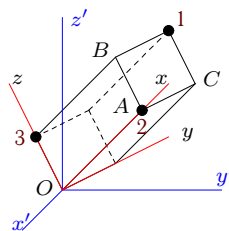
$$AB = 1, AC = 2, OA = 5,$$

$$m_0 = 48, m_1 = 3, m_2 = 4, m_3 = 2,$$

$$\varphi = 4t + \pi/4, \psi = 10t, \theta = 4\sqrt{2}t.$$

Задача D39.34.

4



$$AB = 2, AC = 1, OA = 5,$$

$$m_0 = 12, m_1 = 2, m_2 = 5, m_3 = 1,$$

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

D39 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	2.00	-2.00	10.00	247	891	796	168	252	96	156	540	480	108	162	54	39628.0
2	0.00	4.00	2.00	142	522	484	96	144	36	104	360	320	72	108	36	4856.0
3	1.41	-1.41	5.66	219	359	308	88	108	72	156	300	240	72	108	54	5394.0
4	0.00	-2.00	8.00	318	1098	948	180	360	102	208	720	640	144	216	72	34164.0
5	1.41	-1.41	5.66	52	340	312	45	90	18	20	116	104	15	30	6	4898.0
6	0.00	4.00	8.00	42	324	294	30	60	6	20	160	148	18	36	6	11808.0
7	0.00	-4.00	8.00	72	140	148	42	36	24	64	104	104	36	36	24	6624.0
8	-1.41	1.41	8.49	307	892	999	270	180	90	260	800	900	270	180	90	38783.0
9	0.00	-4.00	4.00	340	322	486	189	102	102	260	260	360	135	90	90	8096.0
10	-0.00	2.00	12.00	67	178	141	36	66	22	40	104	80	18	36	12	9980.0
11	0.00	4.00	2.00	176	308	300	102	114	68	128	208	208	72	72	48	2520.0
12	-4.00	4.00	6.00	140	194	198	66	66	56	96	156	156	54	54	36	7532.0
13	0.00	-2.00	4.00	78	95	145	42	21	24	40	80	104	36	18	12	1542.0
14	0.00	-2.00	8.00	188	621	617	170	170	68	128	464	464	120	120	48	22074.0
15	0.00	6.00	2.00	100	240	244	72	80	36	64	160	160	48	48	24	4376.0
16	0.00	-4.00	8.00	269	448	557	204	128	84	208	320	400	144	96	72	24096.0
17	0.00	2.00	2.00	136	260	260	72	72	44	96	240	240	72	72	36	864.0
18	-1.41	1.41	8.49	117	521	596	160	80	34	80	416	464	120	60	24	22966.0
19	-4.00	4.00	10.00	132	211	191	66	60	36	96	156	156	54	54	36	14310.0
20	0.00	4.00	2.00	243	1107	1008	168	270	72	208	720	640	144	216	72	10296.0
21	0.00	-4.00	4.00	49	432	417	65	60	12	40	232	208	30	60	12	6984.0
22	-2.83	2.83	8.49	77	442	485	100	70	20	60	312	348	90	45	18	21536.0
23	-2.00	2.00	8.00	77	342	385	100	45	18	60	312	348	90	45	18	13990.0
24	2.83	-2.83	5.66	274	1134	1012	180	324	90	208	720	640	144	216	72	19520.0
25	-1.41	1.41	8.49	198	918	864	180	198	54	156	540	480	108	162	54	34308.0
26	0.00	-2.00	8.00	486	1188	1098	306	360	153	360	900	900	270	270	135	39960.0
27	2.83	-2.83	5.66	116	320	308	80	80	40	96	240	240	72	72	36	6672.0
28	0.00	-4.00	4.00	245	720	925	270	75	45	200	520	680	225	75	45	13880.0
29	2.00	-2.00	6.00	124	744	748	156	108	36	96	480	480	108	108	36	14960.0
30	-0.00	4.00	12.00	66	180	210	54	39	18	60	120	156	54	27	18	15696.0
31	-2.83	2.83	8.49	146	279	155	28	72	18	80	200	136	24	72	18	8800.0
32	0.00	4.00	2.00	193	693	580	96	234	48	104	360	320	72	108	36	6320.0
33	4.00	-4.00	14.00	112	645	717	190	80	32	80	416	464	120	60	24	76674.0
34	0.00	2.00	4.00	34	303	281	25	50	10	20	116	104	15	30	6	2774.0

D39 файл о39d4A