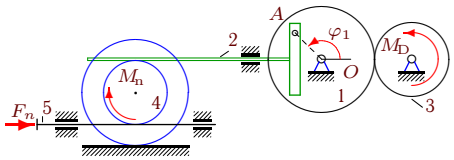
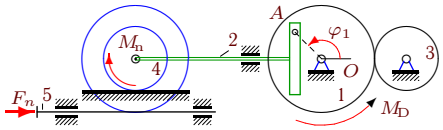
Получить уравнение движения кулисного механизма. Найти значение углового ускорения $\ddot{\varphi}_1$ при $t = 0$.

Вариант 1



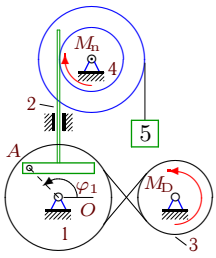
$M_{D_z} = M_0 - k\omega_{3_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$F_{n_x} = -\nu v_{5_x}$,
$M_0 = 9$Нм, $k = 15$Нмс,
$\nu = 8$кНс/м, $\mu = 12$Нмс,
$I_1 = 6$кгм^2, $m_2 = 16$кг,
$m_3 = 34$кг, $m_4 = 26$кг,
$R_1 = 38$см, $r_1 = 27$см,
$R_3 = 28$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 15$см,
$\varphi_{1,0} = 1.3$, $\omega_{1_z,0} = 0.5\frac{1}{c}$.

Вариант 2



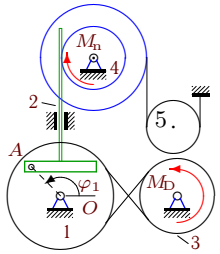
$M_{D_z} = M_0 - k\omega_{1_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$F_{n_x} = -\nu v_{5_x}$,
$M_0 = 10$Нм, $k = 11$Нмс,
$\nu = 8$кНс/м, $\mu = 14$Нмс,
$I_1 = 7$кгм^2, $m_2 = 14$кг,
$m_3 = 32$кг, $m_4 = 24$кг,
$R_1 = 34$см, $r_1 = 23$см,
$R_3 = 24$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 13$см,
$\varphi_{1,0} = 1.1$, $\omega_{1_z,0} = 0.1\frac{1}{c}$.

Вариант 3



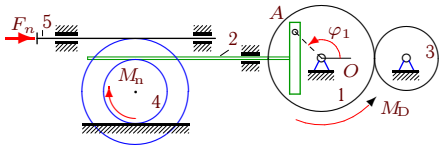
$M_{D_z} = M_0 - k\omega_{3_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$M_0 = 13$Нм, $k = 14$Нмс,
$\mu = 10$Нмс, $I_1 = 18$кгм^2,
$m_2 = 18$кг, $m_3 = 36$кг,
$m_4 = 28$кг, $m_5 = 7$кг,
$R_1 = 37$см, $r_1 = 26$см,
$R_3 = 27$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 17$см,
$\varphi_{1,0} = 1.5$, $\omega_{1_z,0} = 0.4\frac{1}{c}$.

Вариант 4



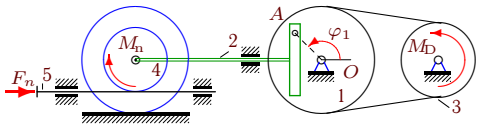
$M_{D_z} = M_0 - k\omega_{3_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$M_0 = 13$Нм,$k = 15$Нмс,
$\mu = 10$Нмс, $I_1 = 18$кгм^2,
$m_2 = 18$кг, $m_3 = 36$кг,
$m_4 = 28$кг, $m_5 = 7$кг,
$R_1 = 38$см, $r_1 = 27$см,
$R_3 = 28$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 17$см,
$r_5 = 12$см,
$\varphi_{1,0} = 1.5$, $\omega_{1_z,0} = 0.5\frac{1}{c}$.

Вариант 5



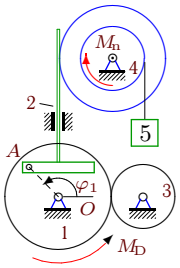
$M_{D_z} = M_0 - k\omega_{1_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$F_{n_x} = -\nu v_{5_x}$,
$M_0 = 14$Нм, $k = 11$Нмс,
$\nu = 20$Нс/м, $\mu = 11$Нмс,
$I_1 = 23$кгм^2, $m_2 = 18$кг,
$m_3 = 36$кг, $m_4 = 28$кг,
$R_1 = 34$см, $r_1 = 23$см,
$R_3 = 24$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 17$см,
$\varphi_{1,0} = 1.5$, $\omega_{1_z,0} = 0.1\frac{1}{c}$.

Вариант 6



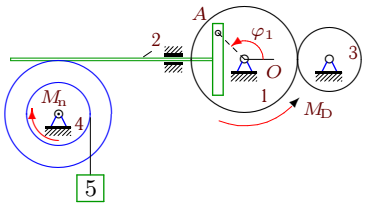
$M_{D_z} = M_0 - k\omega_{3_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$F_{n_x} = -\nu v_{5_x}$,
$M_0 = 9$Нм, $k = 15$Нмс,
$\nu = 8$кНс/м, $\mu = 13$Нмс,
$I_1 = 7$кгм^2, $m_2 = 15$кг,
$m_3 = 33$кг, $m_4 = 25$кг,
$R_1 = 38$см, $r_1 = 27$см,
$R_3 = 28$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 14$см,
$\varphi_{1,0} = 1.2$, $\omega_{1_z,0} = 0.5\frac{1}{c}$.

Вариант 7



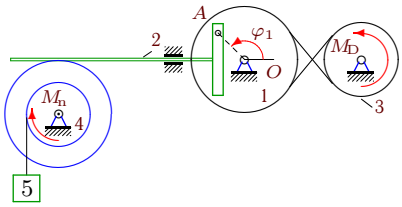
$M_{D_z} = M_0 - k\omega_{1_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$M_0 = 11$Нм, $k = 11$Нмс,
$\mu = 14$Нмс, $I_1 = 11$кгм^2,
$m_2 = 15$кг, $m_3 = 33$кг,
$m_4 = 25$кг, $m_5 = 6$кг,
$R_1 = 34$см, $r_1 = 23$см,
$R_3 = 24$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 14$см,
$\varphi_{1,0} = 1.2$, $\omega_{1_z,0} = 0.1\frac{1}{c}$.

Вариант 8



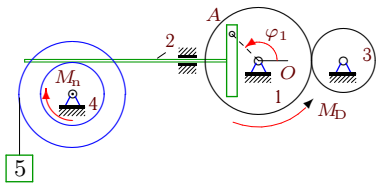
$M_{D_z} = M_0 - k\omega_{1_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$M_0 = 14$Нм, $k = 13$Нмс,
$\mu = 11$Нмс, $I_1 = 23$кгм^2,
$m_2 = 18$кг, $m_3 = 36$кг,
$m_4 = 28$кг, $m_5 = 9$кг,
$R_1 = 36$см, $r_1 = 25$см,
$R_3 = 26$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 17$см,
$\varphi_{1,0} = 1.5$, $\omega_{1_z,0} = 0.3\frac{1}{c}$.

Вариант 9



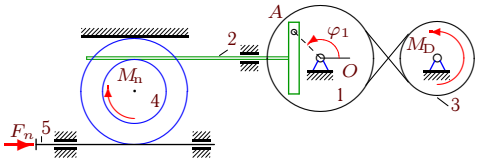
$M_{D_z} = M_0 - k\omega_{3_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$M_0 = 13$Нм, $k = 13$Нмс,
$\mu = 11$Нмс, $I_1 = 18$кгм^2,
$m_2 = 18$кг, $m_3 = 36$кг,
$m_4 = 28$кг, $m_5 = 8$кг,
$R_1 = 36$см, $r_1 = 25$см,
$R_3 = 26$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 17$см,
$\varphi_{1,0} = 1.5$, $\omega_{1_z,0} = 0.3\frac{1}{c}$.

Вариант 10



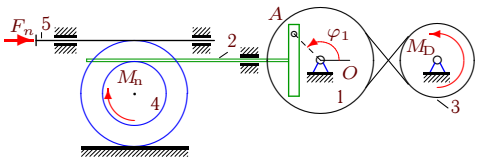
$M_{D_z} = M_0 - k\omega_{1_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$M_0 = 10$Нм, $k = 14$Нмс,
$\mu = 14$Нмс, $I_1 = 7$кгм^2,
$m_2 = 14$кг, $m_3 = 32$кг,
$m_4 = 24$кг, $m_5 = 4$кг,
$R_1 = 37$см, $r_1 = 26$см,
$R_3 = 27$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 13$см,
$\varphi_{1,0} = 1.1$, $\omega_{1_z,0} = 0.4\frac{1}{c}$.

Вариант 11



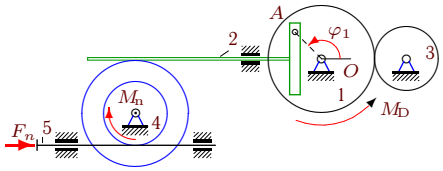
$M_{D_z} = M_0 - k\omega_{3_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$F_{n_x} = -\nu v_{5_x}$,
$M_0 = 10$Нм, $k = 13$Нмс,
$\nu = 25$Нс/м, $\mu = 13$Нмс,
$I_1 = 9$кгм^2, $m_2 = 15$кг,
$m_3 = 33$кг, $m_4 = 25$кг,
$R_1 = 36$см, $r_1 = 25$см,
$R_3 = 26$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 14$см,
$\varphi_{1,0} = 1.2$, $\omega_{1_z,0} = 0.3\frac{1}{c}$.

Вариант 12



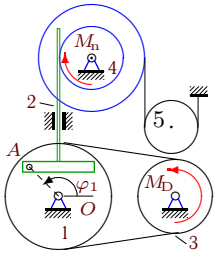
$M_{D_z} = M_0 - k\omega_{3_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$F_{n_x} = -\nu v_{5_x}$,
$M_0 = 12$Нм, $k = 14$Нмс,
$\nu = 15$Нс/м, $\mu = 12$Нмс,
$I_1 = 15$кгм^2, $m_2 = 17$кг,
$m_3 = 35$кг, $m_4 = 27$кг,
$R_1 = 37$см, $r_1 = 26$см,
$R_3 = 27$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 16$см,
$\varphi_{1,0} = 1.4$, $\omega_{1_z,0} = 0.4\frac{1}{c}$.

Вариант 13



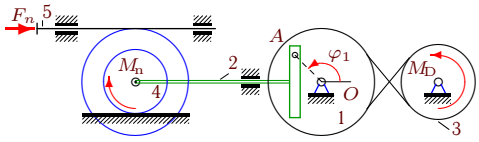
$M_{D_z} = M_0 - k\omega_{1_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$F_{n_x} = -\nu v_{5_x}$,
$M_0 = 14$Нм, $k = 14$Нмс,
$\nu = 8$кНс/м, $\mu = 10$Нмс,
$I_1 = 23$кгм^2, $m_2 = 18$кг,
$m_3 = 36$кг, $m_4 = 28$кг,
$R_1 = 37$см, $r_1 = 26$см,
$R_3 = 27$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 17$см,
$\varphi_{1,0} = 1.5$, $\omega_{1_z,0} = 0.4\frac{1}{c}$.

Вариант 14



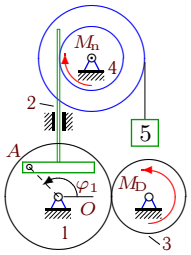
$M_{D_z} = M_0 - k\omega_{3_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$M_0 = 12$Нм,$k = 12$Нмс,
$\mu = 10$Нмс, $I_1 = 13$кгм^2,
$m_2 = 18$кг, $m_3 = 36$кг,
$m_4 = 28$кг, $m_5 = 6$кг,
$R_1 = 35$см, $r_1 = 24$см,
$R_3 = 25$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 17$см,
$r_5 = 11$см,
$\varphi_{1,0} = 1.5$, $\omega_{1_z,0} = 0.2\frac{1}{c}$.

Вариант 15



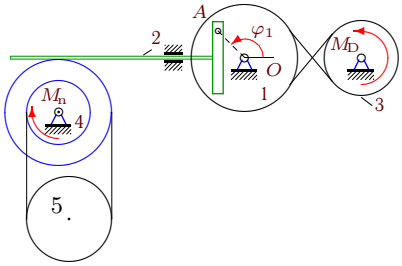
$M_{D_z} = M_0 - k\omega_{3_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$F_{n_x} = -\nu v_{5_x}$,
$M_0 = 9$Нм, $k = 15$Нмс,
$\nu = 40$Нс/м, $\mu = 15$Нмс,
$I_1 = 6$кгм^2, $m_2 = 14$кг,
$m_3 = 32$кг, $m_4 = 24$кг,
$R_1 = 38$см, $r_1 = 27$см,
$R_3 = 28$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 13$см,
$\varphi_{1,0} = 1.1$, $\omega_{1_z,0} = 0.5\frac{1}{c}$.

Вариант 16



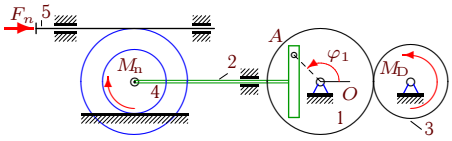
$M_{D_z} = M_0 - k\omega_{3_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$M_0 = 11$Нм, $k = 13$Нмс,
$\mu = 10$Нмс, $I_1 = 8$кгм^2,
$m_2 = 18$кг, $m_3 = 36$кг,
$m_4 = 28$кг, $m_5 = 5$кг,
$R_1 = 36$см, $r_1 = 25$см,
$R_3 = 26$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 17$см,
$\varphi_{1,0} = 1.5$, $\omega_{1_z,0} = 0.3\frac{1}{c}$.

Вариант 17



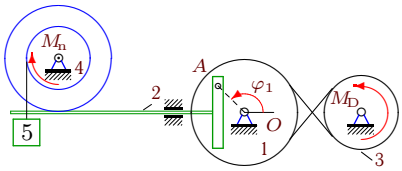
$M_{D_z} = M_0 - k\omega_{3_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$M_0 = 12$Нм,$k = 15$Нмс,
$\mu = 12$Нмс, $I_1 = 15$кгм^2,
$m_2 = 17$кг, $m_3 = 35$кг,
$m_4 = 27$кг, $m_5 = 70$кг,
$R_1 = 38$см, $r_1 = 27$см,
$R_3 = 28$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 16$см,
$r_5 = 16$см,
$\varphi_{1,0} = 1.4$, $\omega_{1_z,0} = 0.5\frac{1}{c}$.

Вариант 18



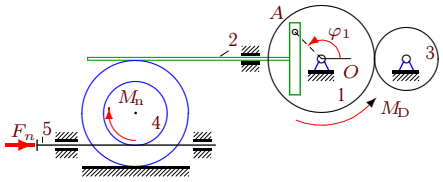
$M_{D_z} = M_0 - k\omega_{3_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$F_{n_x} = -\nu v_{5_x}$,
$M_0 = 10$Нм, $k = 12$Нмс,
$\nu = 25$Нс/м, $\mu = 12$Нмс,
$I_1 = 7$кгм^2, $m_2 = 17$кг,
$m_3 = 35$кг, $m_4 = 27$кг,
$R_1 = 35$см, $r_1 = 24$см,
$R_3 = 25$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 16$см,
$\varphi_{1,0} = 1.4$, $\omega_{1_z,0} = 0.2\frac{1}{c}$.

Вариант 19



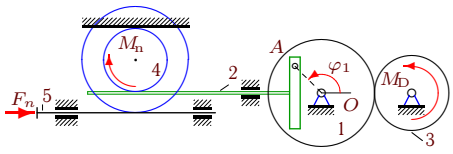
$M_{D_z} = M_0 - k\omega_{3_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$M_0 = 11$Нм, $k = 13$Нмс,
$\mu = 13$Нмс, $I_1 = 12$кгм^2,
$m_2 = 16$кг, $m_3 = 34$кг,
$m_4 = 26$кг, $m_5 = 6$кг,
$R_1 = 36$см, $r_1 = 25$см,
$R_3 = 26$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 15$см,
$\varphi_{1,0} = 1.3$, $\omega_{1_z,0} = 0.3\frac{1}{c}$.

Вариант 20



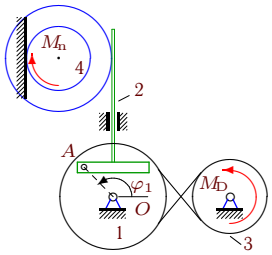
$M_{D_z} = M_0 - k\omega_{1_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$F_{n_x} = -\nu v_{5_x}$,
$M_0 = 14$Нм, $k = 12$Нмс,
$\nu = 8$кНс/м, $\mu = 10$Нмс,
$I_1 = 23$кгм^2, $m_2 = 18$кг,
$m_3 = 36$кг, $m_4 = 28$кг,
$R_1 = 35$см, $r_1 = 24$см,
$R_3 = 25$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 17$см,
$\varphi_{1,0} = 1.5$, $\omega_{1_z,0} = 0.2\frac{1}{c}$.

Вариант 21



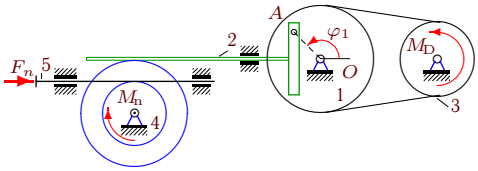
$M_{D_z} = M_0 - k\omega_{3_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$F_{n_x} = -\nu v_{5_x}$,
$M_0 = 10$Нм, $k = 15$Нмс,
$\nu = 25$Нс/м, $\mu = 11$Нмс,
$I_1 = 7$кгм^2, $m_2 = 17$кг,
$m_3 = 35$кг, $m_4 = 27$кг,
$R_1 = 38$см, $r_1 = 27$см,
$R_3 = 28$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 16$см,
$\varphi_{1,0} = 1.4$, $\omega_{1_z,0} = 0.5\frac{1}{c}$.

Вариант 22



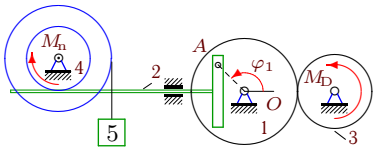
$M_{D_z} = M_0 - k\omega_{3_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$M_0 = 10$Нм, $k = 14$Нмс,
$\mu = 14$Нмс,
$I_1 = 9$кгм^2, $m_2 = 15$кг,
$m_3 = 33$кг, $m_4 = 25$кг,
$R_1 = 37$см, $r_1 = 26$см,
$R_3 = 27$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 14$см,
$\varphi_{1,0} = 1.2$, $\omega_{1_z,0} = 0.4\frac{1}{c}$.

Вариант 23



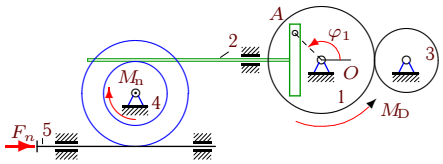
$M_{D_z} = M_0 - k\omega_{3_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$F_{n_x} = -\nu v_{5_x}$,
$M_0 = 12$Нм, $k = 12$Нмс,
$\nu = 20$Нс/м, $\mu = 11$Нмс,
$I_1 = 13$кгм^2, $m_2 = 18$кг,
$m_3 = 36$кг, $m_4 = 28$кг,
$R_1 = 35$см, $r_1 = 24$см,
$R_3 = 25$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 17$см,
$\varphi_{1,0} = 1.5$, $\omega_{1_z,0} = 0.2\frac{1}{c}$.

Вариант 24



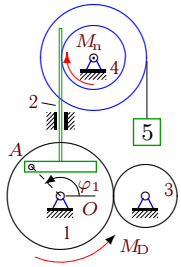
$M_{D_z} = M_0 - k\omega_{3_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$M_0 = 8$Нм, $k = 13$Нмс,
$\mu = 13$Нмс, $I_1 = 5$кгм^2,
$m_2 = 15$кг, $m_3 = 33$кг,
$m_4 = 25$кг, $m_5 = 2$кг,
$R_1 = 36$см, $r_1 = 25$см,
$R_3 = 26$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 14$см,
$\varphi_{1,0} = 1.2$, $\omega_{1_z,0} = 0.3\frac{1}{c}$.

Вариант 25



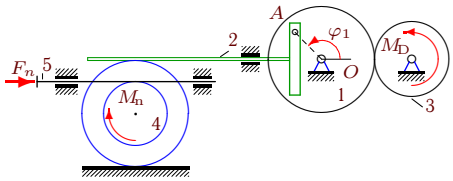
$M_{D_z} = M_0 - k\omega_{1_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$F_{n_x} = -\nu v_{5_x}$,
$M_0 = 12$Нм, $k = 13$Нмс,
$\nu = 8$кНс/м, $\mu = 12$Нмс,
$I_1 = 15$кгм^2, $m_2 = 16$кг,
$m_3 = 34$кг, $m_4 = 26$кг,
$R_1 = 36$см, $r_1 = 25$см,
$R_3 = 26$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 15$см,
$\varphi_{1,0} = 1.3$, $\omega_{1_z,0} = 0.3\frac{1}{c}$.

Вариант 26



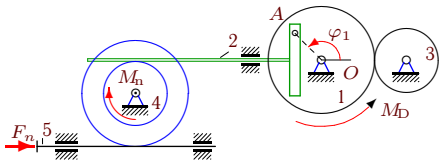
$M_{D_z} = M_0 - k\omega_{1_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$M_0 = 13$Нм, $k = 14$Нмс,
$\mu = 11$Нмс, $I_1 = 19$кгм^2,
$m_2 = 17$кг, $m_3 = 35$кг,
$m_4 = 27$кг, $m_5 = 7$кг,
$R_1 = 37$см, $r_1 = 26$см,
$R_3 = 27$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 16$см,
$\varphi_{1,0} = 1.4$, $\omega_{1_z,0} = 0.4\frac{1}{c}$.

Вариант 27



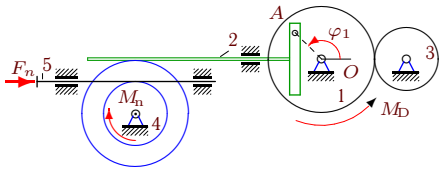
$M_{D_z} = M_0 - k\omega_{3_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$F_{n_x} = -\nu v_{5_x}$,
$M_0 = 9$Нм, $k = 14$Нмс,
$\nu = 30$Нс/м, $\mu = 13$Нмс,
$I_1 = 6$кгм^2, $m_2 = 16$кг,
$m_3 = 34$кг, $m_4 = 26$кг,
$R_1 = 37$см, $r_1 = 26$см,
$R_3 = 27$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 15$см,
$\varphi_{1,0} = 1.3$, $\omega_{1_z,0} = 0.4\frac{1}{c}$.

Вариант 28



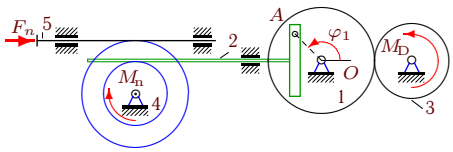
$M_{D_z} = M_0 - k\omega_{1_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$F_{n_x} = -\nu v_{5_x}$,
$M_0 = 11$Нм, $k = 12$Нмс,
$\nu = 8$кНс/м, $\mu = 13$Нмс,
$I_1 = 11$кгм^2, $m_2 = 15$кг,
$m_3 = 33$кг, $m_4 = 25$кг,
$R_1 = 35$см, $r_1 = 24$см,
$R_3 = 25$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 14$см,
$\varphi_{1,0} = 1.2$, $\omega_{1_z,0} = 0.2\frac{1}{c}$.

Вариант 29



$M_{D_z} = M_0 - k\omega_{1_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$F_{n_x} = -\nu v_{5_x}$,
$M_0 = 11$Нм, $k = 14$Нмс,
$\nu = 35$Нс/м, $\mu = 14$Нмс,
$I_1 = 11$кгм^2, $m_2 = 15$кг,
$m_3 = 33$кг, $m_4 = 25$кг,
$R_1 = 37$см, $r_1 = 26$см,
$R_3 = 27$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 14$см,
$\varphi_{1,0} = 1.2$, $\omega_{1_z,0} = 0.4\frac{1}{c}$.

Вариант 30



$M_{D_z} = M_0 - k\omega_{3_z}$,
$M_{n_z} = -\mu\omega_{4_z}$,
$F_{n_x} = -\nu v_{5_x}$,
$M_0 = 10$Нм, $k = 14$Нмс,
$\nu = 25$Нс/м, $\mu = 12$Нмс,
$I_1 = 7$кгм^2, $m_2 = 17$кг,
$m_3 = 35$кг, $m_4 = 27$кг,
$R_1 = 37$см, $r_1 = 26$см,
$R_3 = 27$см, $R_4 = 20$см,
$r_4 = 12$см, $i_4 = 16$см,
$\varphi_{1,0} = 1.4$, $\omega_{1_z,0} = 0.4\frac{1}{c}$.

Ответы

$T = (\dot{\varphi}^2/2)(A + B\sin^2\varphi)$

	A	B	Q	ε
1	8.455	2.323	-46.915	-4.435
2	8.850	3.500	-10.124	-0.872
3	20.464	5.344	-30.620	-1.491
4	20.599	5.940	-33.863	-1.636
5	25.081	2.066	11.708	0.431
6	9.383	3.809	-52.420	-4.156
7	12.907	1.445	-2.116	-0.161
8	25.333	2.592	-8.241	-0.296
9	20.333	2.569	-18.865	-0.825
10	9.190	3.602	-1.326	-0.129
11	11.138	15.488	-64.588	-2.645
12	17.396	2.318	-30.653	-1.563
13	25.464	2.032	-1.891	-0.070
14	15.205	4.634	9.891	0.650
15	8.310	4.824	-64.420	-5.346
16	10.333	4.854	-25.173	-2.428
17	17.527	4.336	-77.261	-3.563
18	9.144	5.299	-30.016	-2.103
19	14.203	2.049	-36.873	-2.292
20	25.205	1.731	7.216	0.268
21	9.527	2.606	-35.718	-2.971
22	11.259	1.575	-47.234	-4.112
23	15.205	1.731	11.161	0.659
24	7.138	3.411	-25.639	-2.548
25	17.203	2.041	-11.001	-0.578
26	21.396	4.723	1.962	0.097
27	8.327	1.768	-25.371	-2.552
28	13.021	1.714	-2.554	-0.178
29	13.259	1.644	2.818	0.186
30	9.396	2.417	-30.858	-2.633