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Formularium mechanica Tri 3 – 6IW

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$$W_F(t_0, t_1) = F\,.\,\Delta r(t_0, t_1).\cos\theta_F$$

$$F = \frac{m\,.\,a - m\,.\,g\,.\ \cos(90° + \alpha) + \ f_d\,.\cos(180° - \alpha)}{f_d\,.\sin\theta_F + \cos\theta_F}$$

(Enkel geldig bij translatie omdat $F_R = m\,.\,a$)

Arbeidsvergelijking v/e massapunt: $W_{F_R}\,(t_0, t_1) = \ F_R(t)\,.\,\Delta r(t_0, t_1)\,.\cos\theta$

Lichaam dat transleert: $W_{F_R}(t_0, t_1) = \ \Delta E_k(t_0, t_1) = \frac{m\,.\ v^2(t_1)}{2} - \frac{m\,.\ v^2(t_0)}{2}$

Lichaam dat roteert: $W_{F_R}(t_0, t_1) = \ \Delta E_k(t_0, t_1) = \frac{I_z\,.\ \omega^2(t_1)}{2} - \frac{I_z\,.\ \omega^2(t_0)}{2}$

Rollend lichaam: $W_{F_R}(t_0, t_1) = \ \Delta E_k(t_0, t_1) = \frac{m\,.\ v_a^2(t_1)}{2} + \frac{I_z\,.\ \omega^2(t_1)}{2} - \frac{m\,.\,v_a^2(t_0)}{2} - \frac{I_z\,.\ \omega^2(t_0)}{2}$

Zuiver rollen & volle cilinder: $E_k(t) = \frac{3}{4}\,.\,m\,.\,v^2(t)$

Potentiële energie: $\Delta E_p(t_0, t_1) = m\,.\,g\,.\,\Delta s_y(t_0, t_1) = \ -W_{F_z}(t_0, t_1)$

$$\Delta r(t_0, t_1) = \ \Delta\theta(t_0, t_1)\,.\,r$$

$$W_{F_R}(t_0, t_1) = \ M_R.\Delta\theta(t_0, t_1) = \ I_z\,.\,\alpha\,.\ \Delta\theta(t_0, t_1)$$

$$v = \omega\,.\,r$$