

Task 12 Non-shifted piston engine

Task

A non-shifted piston engine should rotate at a constant angular velocity, without the piston delivering the work. The effect of potential energy is thereby neglected. The moment $M_A(\varphi) = -M_{1,1}(\varphi) - M_{1,2}(\varphi)$ must be applied on the crank for the acceleration of the connecting rod and the piston. Prove the validity of the equation:

$$M_A(\varphi) = \frac{d}{d\varphi} E_k(\varphi)$$

that means that the moment corresponds to the change of kinetic energy under the above-mentioned conditions. ($\omega_1 = \dot{\varphi}_1 = \text{const.}$)

