MOTION DYNAMICS OF THE CUTTER HOLDER MECHANISM AT A SHAPING MACHINE

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In the paper it is examined the steady state regimes of motion of the cutter holder mechanism at a shaping machine, driven by an asynchronous electric motor, through a crank and connecting rod assembly. The mechanism has rigid elements, but the link between the crank and connecting rod assembly and the cutter holder is elastic. The mechanical characteristic of the aggregate consisting in the motor, the crank and connecting rod assembly and the cutter holder is non-linear. It is considered the case of the steady state regimes, near the regime of main resonance of the aggregate.

It is considered the cutter holder mechanism of a shaping machine, having the dynamic model in figure 1.

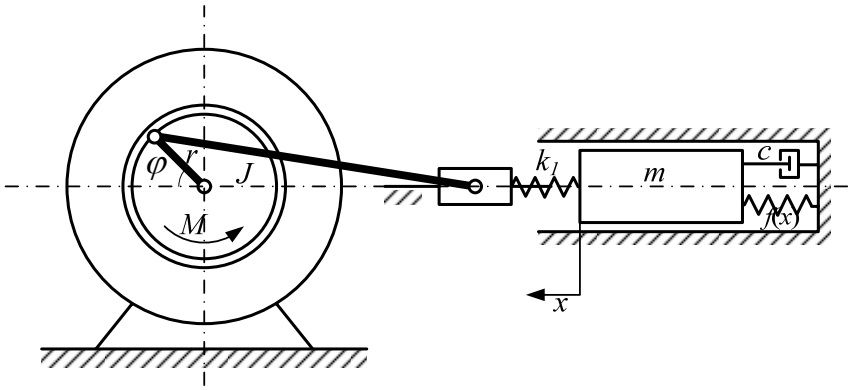

Fig.1. Dynamic model of mechanism

The mechanism is equipped with a viscous damper, having a linear damping characteristic (c - coefficient of viscous damping) and an elastic system of suspension, with a non linear elastic characteristic, $f(x)$. The cutter holder of mass m is driven by an electric motor, developing a torque of moment M (J - moment of inertia of the whole aggregate, reduced to the motor axis, φ - angle of rotation of motor rotor), through a transmission consisting of a crank (r - length of crank) and connecting rod assembly, with rigid elements and negligible masses and an arc, with a linear elastic characteristic (k_1 - rigidity of arc).

The steady state regimes are determined by the Poincaré method.

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