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Synthesis of cam gears of machine tools of automatic control units for manufacturing of hardware

Increase of the requirements to productivity, accuracy of reliability, metal and capacity of cutting machines, the improvement of the quality of the projects have stipulated broad usage of a computer while designing . The introduction of an automated design engineering system presupposes the change of labour technology while designing of new products. In the field of machine-tool construction CAD will allow to execute:

- Complex design calculations of clusters on the basis of the requirements to the machine tool as a whole;
- Numerical matching of many versions of designs and their optimization according to different yardsticks of functionability;
- Optimization of the design solutions in essentially new working conditions of the machine tool.

Cam gears

Cam gears are three link mechanism with a maximum kinematic pair the input link of which is called the cam,, and output link is - thruster (or rocker arm). Often to replace in a maximum pair coupler by rolling friction and to reduce wearing of both cam, and thruster, in the scheme of the gear actuate a padding link - roller and rotary kinematic pair. The mobility in this roler pair does not change transfer functions of the gear and is local motility.

Assigning and field of application

The cam gears are intended for transformation (conversion) rotary or translational motion of the cam into-rotary or reciprocal motion of the thruster. Thus in the gear with two mobile links it is possible to realize transformation (conversion) of motion under the composite law. The relevant advantage of cam gears is the capability to

provide precise immobility of an output link. This advantage has determined their broad application in the elementary devices of frame automatics and in mechanical computing devices (adding machines, calendar gears). The cam gears can be sectioned into two groups. In The gears of 1-st the group movement of the thruster is on a desired law of motion. The gears of the second group provide only given maximum (movement) of an output link - course of the thruster. Thus the law, on which one implements this (movement), is selected from a set of the standard laws of motion depending on the operation conditions and production process.

Classification of cam gears

The cam gears are categorized to following tags:

• on arrangement of links in space

Space (spatial)

Flat

• on motion of the cam

Rotary

Translational

Screw (propeller)

• on motion of an output link

Reciprocating (with the thruster)

Into-rotary (with a rocker arm)

• on availability of a roller With a roller

Without a roller

• by the form of a cam Disk (flat)

Cylindrical

Conoid (composite space (spatial)

• under the shape of a working surface of an output link Flat

Concentrated

Cylindrical

Spherical

Evolvent

• on a way of closing of members of a maximum pair

At power short circuit the deleting of the thruster implements effect of a contact surface of the cam on the thruster (leading link - cam conducted - the thruster). The motion of the thruster at approach implements at the expense of elastic energy of a spring or force of weight of the thruster, thus the cam is not a leading link. At geometrical closing the motion of the thruster at deleting implements effect of an outside working surface of the cam on the thruster, at approach - effect of an internal working surface of the cam on the thruster. On both phases of motion the cam is a leading link, thruster is a conductor.

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