EQUIPMENT ERROR COMPENSATION METHODS

Elmurodov O'tkir Tolibovich
Sam DVMCHBU academic lyceum physics teacher

Annotation*: In this article, the issues of compensating errors in the principle of operation of equipment and eliminating the reasons for their failure during technical operation are considered. Their formulas are explained in detail on the basis of mathematical models. The cases of compensation in the positioning of the laser beam are explained. It is proposed to lighten by active compensation using a piezo motor.*

Keywords*: Compensation, Kalman filter, math modul ,"screw-nut", laser light,piezo.*

ACCESS:

One of the main parameters of modern technological systems is accuracy of work and high level of speed. In addition, various errors occur in the system during operation, some of them are difficult to occur, and sometimes it is impossible to predict when designing a technological system. It is necessary to compensate for possible errors during the calculation and design phase.

DISCUSSION:

It is possible to eliminate the product assembly to achieve the current accuracy parameters of the system. A number of non-linear errors must be compensated. If we look at the coordinate table as an example, a moving carriage consisting of a working body is placed on it. Working body with the help of an electric motor, it moves in the specified direction and delivers the "screw-nut".

THE RESULT:

An optical measuring device and cutting instruments are used as a working body. Movement along two axes can be implemented. Vibrations occur during the operation of the device, and as a result, positioning errors appear. Vibration can occur due to insufficient uniformity of the structure, wrong choice of the type of electric drive or wrong control parameters given to the transmission. The causes of the above-mentioned errors can be considered and compensated for during the design of the structure. But if we need a high level of accuracy, then adaptive elements may be required. In this case, the construction of the working body is made using a piezo motor, which achieves mechanical movement due to the reverse piezoelectric effect, and an active compensation system. It is suggested to change it by clicking.. Piezo drive provides almost no inertia, almost noiseless in the sound range (30 Hz 15 kHz), excellent speed (moves quickly up to 10 g). They are characterized by a high precision position up to a few micrometers. The operating frequency range is from 40 to 200 kHz. Let's consider the case of laser beam positioning error compensation. Worker if we assume that the diameter of the handle is 500 µm, the error in positioning the carriage for every 500 mm of 400 µm occurs. When using a SQL-type drive with a positioning error of 0.5 µm, we need a compensation element travel of 800 micrometers. The crkin walk of the stock is in the current range when the total length area is equal to 6000 micrometers, we can compensate for positioning errors down to 0.5 µm. Positioning a small one containing one gyroscope and two accelerometers to track errors platform can be used. Such a configuration is a more accurate measurement using the Kalman filter allows you to create a scheme [I]. Having sufficient speed for the correct operation of the scheme, which depended on the performance of the gyro platform controlled by advance guidance in oscillations compute block is required. Taking the mathematical model of the system movement and the measurement process as linear, we can express it in the following form:

x=Ax+y=Bx + (n=1,2,..)

Here is the phase vector of the system, the measurement vector, -random measurement vector, "- the system's randomization vector [2]

CONCLUSION:

This method provides high accuracy and speed in the technological system. The disadvantages of this method are errors strongly depend on the prediction of signal parameters in the initial conditions.

REFERENCES

1. Sinitsin LN. filtri Kalmana i Pugacheva /IN. sinitsin; Moskva, Logos, 2006, -640 s...
2. Pankratov V. A. Kalmana v zadachax opredeleniya vrashatelnogo dvijeniya sputnikov/ dissertatsiya ; Moscow, 2014.