

## EVALUATION OF MAXIMAL ERROR OF STAR SELECTION CRITERION FOR THE PROBLEM OF ASTRONAVIGATION

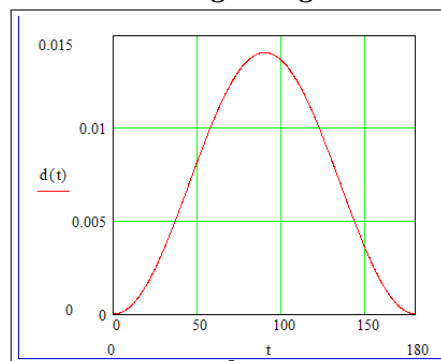
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In the last time satellite system are often used in telecasting, Internet, cellular communications, in objects position determination of surface, aerography and others fields. Satellites stability on the orbit couldn't provide without precise problems solution of satellites orientation in space. This problem is especially important for system like GPS. Among all methods of satellites orientation are extensively use the method of astronavigation (celestial guidance) [1], [2]. Stars selection criterion among a multitude of equality by tasks solution of astronavigation is a constancy of angular interval between them. Meanwhile, in the celestial guidance's apparatus is measured an interval between stellar projection on CCD-sensor, but not an angular interval between stars.

If as criterion of stars selection is used intervals equality between stellar projections appears an error. It is necessary to determine at which angle  $\beta$  between fulcrum pin and optic axis an error would be maximal. For this question solution is used a computer simulation in Mathcad. For simulation were used following parameters: absolute value of angular velocity vector  $|\omega| = 20'/\text{sec}$ , coverage duration  $\tau = 14$  sec, angular interval between stars –  $\psi = 14^\circ$  ( $\pm 7^\circ$ ). Angle  $\beta$  vary from  $0^\circ$  to  $180^\circ$ . Result of Simulation (see the Fig.) show, that an error will be maximal, when the angle  $\beta$  is equal  $90^\circ$  - fulcrum pin and optic axis are perpendicular.

**Error-angle diagram**



(X-direction – degree, Y-direction – millimeter,  
 $|\omega| = 20'/c$ ,  $\tau = 14$  c,  $\psi = 14^\circ$  ( $\pm 7^\circ$ ))

### References

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2. *Kusmin V.S. Fedoseev V.I.* Optiko-elektronnie pribori orientacii i navigacii kosmicheskikh apparatov: opit rasrabotki, problemi i tendenzii // Optical journal 1996, № 7. page 5-9.