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## ALGORITHM OF INS CORRECTION ON THE BASE OF RANGE INFORMATION

Inertial navigation system is a universal navigation system for determination of trajectory motions and angular coordinates (roll, pitch, and heading angles) of aircraft. Unlimited increasing of errors in time is essential disadvantage of INS, so the methods of correction of these systems have a great importance.

Main advantages of INS are high speed of information output, high informativeness, full autonomy, high disturbance protection, reliability of navigation equipment.

Disadvantages of INS are: measurement elements of INS (accelerometers and gyro) have their own methodical and instrumental errors; input data cannot be entered absolutely correct; calculator of INS has its own errors.

Error equations of INS are:

$$\Delta x^{'} = \Delta V_x, \Delta V_x^{'} = 0; \Delta y^{'} = \Delta V_y, \Delta V_y^{'} = 0; \Delta H_{IN}^{'} = \Delta V_{H}, \Delta V_{H}^{'} = \delta_{jH},$$

where $\left(\Delta x, \Delta y, \Delta H\right)$ are coordinates and $\left(\Delta V_x, \Delta V_y, \Delta V_{H}\right)$ are velocities of motion.

The most widespread correction complex is inertial satellite navigation system. During SNS rejection correlated extreme navigation system (CENS) can provide automatic correction of current coordinates. Correlated extreme navigation system (CENS) is the system of processing of information, which is represented as random functions (fields); it is assigned for determination of coordinates of motion.

Observations in this case is a scalar value, it appears as difference between measurements of INS vertical channel and radio altimeter:

$$z = H_{uH}^{*} - D^{*} \cos \varphi^{*} \cos \gamma^{*},$$

It can be expressed as

$$D^{*} = \frac{H\left(x, y\right) - f\left(x^{*} - \Delta x + D^{*} \cos \varepsilon^{*}, y^{*} - \Delta y + D^{*} \cos \delta^{*}\right)}{\cos \varphi^{*} \cos \gamma^{*}} - \delta_{f}$$

where D* is output signal of radio altimeter; δf is radio altimeter error, expected by random function of white noise type with spectrum density SD.

CENS provides possibility of INS correction in continuous mode. CENS error decreases in time because clarification of relief by standard map is executed, and a quality of INS correction will increase.