Abstract of the Article
"Anticrisis Monitoring of Financial and Economic Indices of a Machine Building Enterprise"
by P. Pererva, V. Tovazhniansky

In order to conduct effective anticrisis monitoring the authors propose to use two analytical functions *F1* and *F2*. Each of these functions can to some extent serve as an independent representation of the enterprise's condition. Characteristics of industrial activities of a machine building enterprise can be received with the help of *F1* function which is formed by bivariant algorithm:

First variant: $F_1 = tg\frac{\pi}{4}\left(\frac{y-x}{y}\right) \to y > x$, function is determined within interval [0; 1].

Second variant: $F_1 = tg\frac{\pi}{4}\left(\frac{y-x}{x}\right) \to y < x$, function is determined within interval [-1; 0].

Where *x* is production output in thousands hrn; *y* is production sales in thousands hrn.

Choice of tangent analytical dependency for *F1* function allows to limit the range of values for this function by interval of [-1; +1] and due to curvilinearity of *F1* function it is possible to track change gradient of production volumes or production sales volumes on the market. In particular, one can forecast intervals of production volumes decrease (when *x > 0*) or sales volume (*y > 0*).

Analysis conducted by the authors of this article showed that analytic cotangent function is the most relevant for description of enterprises' financial indices:

$$F_2 = \frac{4}{\pi} arctg\left(\frac{\alpha - \beta - \gamma - \eta}{\sqrt{\alpha^2 + (\beta + \gamma + \eta)^2}}\right)$$

where α is accounts receivable of the enterprise, thousands hrn; β is accounts payable of the enterprise, thousands hrn; γ – enterprise's debts to the budget (state and local), thousands hrn; η – salary debts of the enterprise to its personnel, thousands hrn.

Function *F2* is used for objective and accurate evaluation of the enterprise's financial condition, for identification and description of special financial situations at the enterprise (received and not returned credits, i.e. (β + γ + η) > α; the enterprise itself acts as financial investor when (β + γ + η) < α, etc.).

Arctangent function was chosen due to more precise and detailed analysis of situation when sum (β + γ + η) tends to value α, and in general function F2 tends to zero. Analytic arctangent function is also better affected by normalization within the range [-1; +1].

Functions *F1* and *F2* when used for anticrisis monitoring of financial and production performance of machine building enterprises give positive results. At the same time each of these functions shows results of enterprises condition in certain industries – production or financial which irrespective of their importance for enterprises' activities have autonomous influence. That is why according to the authors' opinion complex anticrisis monitoring of financial and economic indices of machine building enterprise's performance is possible only with concurrent (integral) use of functions *F1* and *F2*. In order to reach this goal the authors propose to use Cartesian coordinate system (Cartesian phase area) where coordinates are to be normalized with the use of values of functions *F1* and *F2*. As the range of values of each function *F1* and *F2* is limited with values +1…-1 this means that inner points of square $(-1) \leq F_1 \leq (+1)$; $(-1) \leq F_2 \leq (+1)$ contain all variety of common values *F1* and *F2*. Upon determining values of these functions for each given moment we can find the point on the phase area and depending of its position we can make economic comments of production and financial condition of the enterprise.