JUSTIFICATION OF TRENDS WHEN CYCLIC VARIATIONS OF INDICATORS

Krukov A.F.,
Dr. of Economics, prof.
Krukova I.A., teacher of Economics
Federal University of Sibiria, Russia

Conference participants, National championship in scientific analytics, Open European and Asian research analytics championship

This article speaks about reflection of time indexes of progress and it give estimate , which describe the direction of economic progress of organizations .

Keywords: Reflection. Time indexes. Progress. Estimate. Direction of economic progress.

There are cycle processes in to economic. It's necessary them test for admission management solutions. For this affect is needed to use concept of trend of senses of indexes of indicators. There are offer next approaches to use.

If $X^{min2}>X^{max1}$ and (X_l, X_{l+1}) ~ $X_2>X_1$, then it can consider, that trend of change s of concept of economic development of organizations as positive and strong.

If $X^{max1}>X^{max2}$ and (X_l, X_{l+1}) ~ $X_2>X_1$, then it can consider, that trend of changes of concept of economic development of organizations as positive, but weak.

If $X^{max1}=X^{max2}$ and (X_l, X_{l+1}) ~ $X_2>X_1$, then it can consider, that trend of change s of concept of economic development of organizations as simply positive.

If $X^{max1}<X^{max2}$ and (X_l, X_{l+1}) ~ $X_2<X_1$, then it can consider, that trend of changes of concept of economic development of organizations as negative and strong.

If $X^{max2}>X^{max1}$ and (X_l, X_{l+1}) ~ $X_2<X_1$, then it can consider, that trend of changes of concept of economic development of organizations as negative but weak.

If $X^{max2}=X^{max1}$ and (X_l, X_{l+1}) ~ $X_2<X_1$, then it can consider, that trend of changes of concept of economic development of organizations as simply negative.

Border (limit) between strong or weak of trends of negative or positive characters are needed mathematical estimate.

Trend is stable variations of fluctuating operational indicators of organization. It is often required with measured fluctuations of values of its economic condition indicators to set limits of the trend of enterprise operation indicators growth theoretically [1]. To determine them in a first approximation we assume that the life cycle of organization is sinusoidal. Peak values of indicators in this cycle are A_m.. It is measured average values of i-indicators - $X_{il}=X_{i+1}$. It is required to set a coefficient of proportionality (coefficient of the trend – k, where k > 1) among values X_l, X_{l+1}, if growth of indicators is observed. In addition it is satisfied a relation that maximum of values of i-indicator in the previous cycle is not more than minimum of values of i-indicator in the consequent cycle (Fig. 1).

$$\text{Let } \overline{X_{i+1}} = k\overline{X_i}(1), k>1, A_m = const, X_i^{1\max} \le X_i^{2\min} \quad (1)$$

Construct the following (Fig. 1).

Draw a tangent – BA between the points $X_i^{1max}X_i^{2max}$ and the line of average values of i-indicator – ML through the points X_l, X_{l+1}. From the point A (X_i^{2min}) drop a perpendicular – *AF to ML*. From the point M (X_l) drop the perpendicular MN to DN (line X_{l+1}) From the point N draw the line NK parallel to ML, and drop from the point D to NK the perpendicular DK.

From constructed right-angled triangle ΔMDN express sinα:

$$\sin\alpha = \frac{DN}{MD}$$

where $DN=X_{l+1}—X_l$(MN_DN) Inserting dependence (1) for X_{l+1} fix

$$DN = \overline{X}_i(k-1), aMD = T_{oц}$$

In this case:

$$\sin\alpha = \frac{x_i(k-1)}{T_{oц}} \quad (2)$$

Consider the similar triangles (fig.1):

$\Delta OFA \sim \Delta MDN$

(DF coinsides with *MD, FA⊥DF, DM ⊥MN).* It is followed from the triangle *ΔOFA*

$$\tan\alpha = \frac{FA}{FO} \quad (3)$$

where $FA \le A_m, FO \le OL = 3/4\ T_{oц}$ which are to be inserted into the expression (3), then:

$$\tan\alpha = \frac{4A}{3T_{oц}} \quad (4)$$

It is followed from the similar triangles $\Delta DNK \sim \Delta OFA$ ($DN \perp OA$, $DK \perp OF$):

$$\cos\alpha = \frac{DK}{DN} \quad (5)$$

where $K \le Am$, $DN = Xi\ (k\text{-}1)$, which are to be inserted into the formula (5) and transform it:

$$\cos\alpha = \frac{A_m}{X_i(k-1)} \quad (6)$$

Taking into account that $\tan\alpha = \frac{\sin\alpha}{\cos\alpha}$ include values sin α from the equation (2), and *cos α* from the formula (6). Set the constraints for tg α from the expression (4).

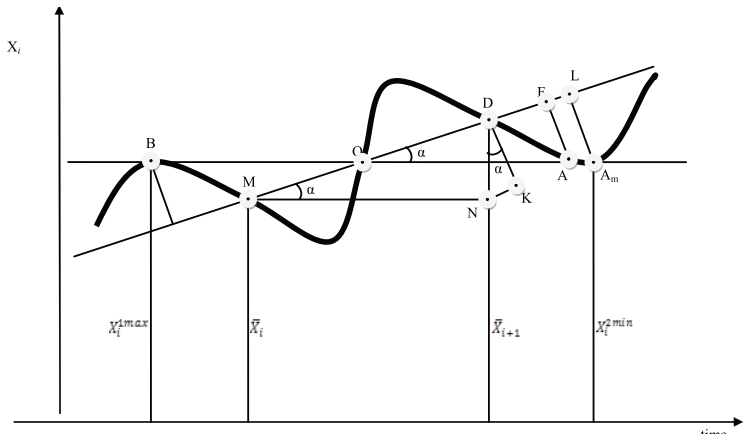

Fig. 1. Graph with trend

Get the inequation after transformations:

$$\frac{[X_i(k-1)]^2}{T_{oy}A_m} \le \frac{4A_m}{3T_{oy}} \quad (7)$$

Modify the inequation (7) with respect to k

$$k \le 1 + \frac{A_m}{X_i}\sqrt{1.33} \quad (8)$$

Insert k under the inaquation (8) into the expression (1) and get as a result:

$X_{i+1} \le X_{i+1} + A_m \sqrt{1.33}$

In this case trend will have stable growth when cyclic sinusoidal changing i-indicator, provided its each value on consequent measures will satisfy the in equation (9).

References:

1. Kor n G. Guide – book of mathematic / G. Kor n, T.Kor n .- M.: Fizmatgiz, 1985.- 450 p