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# THE STATISTICAL REFLECTION OF THE APPROACHES CONCERNING THE TRAINING MODEL FOR THE INCREASE OF THE SPEED

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**Abstract:** This paper reflects the methodical of the training for to increase the speed for the F.C. Otelul Galati football team players. The purpose of this research consists in the elaboration of the methods and means which can to influence the increase of the game speed for the F.C. Otelul Galati football team players. The statistical methods of the research used are: the „Coefficients of Variation Method" and the „Least Squares Method" applied for to calculate the parameters of the regression equations and for to identify the best trend model. The statistical analysis reflected the effectiveness of the methods and means used for to increase the game speed of the F.C. Otelul Galati footballers, because the results of the research were positive, the progress between the initial and final tests being visible.
**Key words:** trend, regression, forecast, speed.

## INTRODUCTION

For to drive the speed training the coach musts to have a documentation and a evidence of the players on the periods of the competitional year and on games, and in this way he cans to achieve the management of the effort, a planning of the preparation and a maximum efficiency in each play. The state of the art in this domain is represented by the essential research belongs to Cojocaru V. and Radulescu M. who elaborated a strategy for the preparation for to increase the speed in the football game of the players [1], [7].

## AIM

The aim of the theme proposed for research consists in to establish the optimal methods and means for to increase the game speed of the F.C. Otelul Galati footballers and for to demonstrate them effectiveness in the modern football.

## HYPOTHESIS

This paper has the next hypothesis: we suppose that the symbiosis of the shapes regarding the speed with others factors of the training, will can to conduct at the increase of the game speed for the F.C. Otelul Galati football team players.

## MATERIAL AND METHODS

The experimentul it carried out on the period 2013-2014 at F.C. Otelul Galati and in research we included eighteen 10-12 years old players. In the aim of the achievement concerning this paper, we used the next research methods: the scientifical documentation, the statistical method and the observation method.

In this research, we achieved the nexts tests concerning driving level: 30 m dash, 30 m dash with the ball, the driving of the ball through milestones in speed, 3 racing in penalty area, the hitting of the hanged ball with the head in 15 seconds, the no. 1 complex sample, the no. 2 complex sample. The tests were applied in three stages: the initial in October 2013, the intermediate in December 2013 and final in May 2014.

## RESULTS OF THE RESEARCH

If we analyse the table 1¸ we observe that:

*1) 30 m dash*: the initial average is 5,1 sec.; the intermediate average is 4,9 sec.; the final average is 4,6 sec. The progress between the initial and final average is - 0,5 sec.
*2) 30 m dash with the ball:* the initial average is 6,3 sec; the intermediate average is 6,1 sec; the final average is 5,8 sec. The progress between the initial and final average is - 0,5 sec.
*3) the driving of the ball through milestones in speed:* the initial average is 26,6"; the intermediate average is 25,0"; the final average is 24,4". The progress between the initial and final average is - 2,2".
*4)3 racing in penalty area:* the initial average is 48,6"; the intermediate average is 47,8"; the final average is 46,9". The progress between the initial and final average is - 1,7".
5*) the hitting of the hanged ball with the head in 15 seconds:* the initial average is 9,6; the intermediate average is 13,6; the final average is 13,7. The progress between the initial and final average is 4,1.
*6) the no. 1 complex sample:* the initial average is *16,5"*; the intermediate average is *16,3"*; the final average is *15,2"*. The progress between the initial and final average is – *1,3 "*.
*7) the no. 2 complex sample:* the initial average is *17,3"*; the intermediate average is *16,3"*; the final average is *15,6"*. The progress between the initial and final average is – *1,7"*.

**Table 1 The values of the initial tests, intermediates tests and final tests for F.C. Otelul Galati team**

| No. | Name and firstname | 30 m dash | 30 m dash with the ball | The driving of the ball through milestones in speed | 3 racing in penalty area | The hitting of the hanged ball with the head in 15 seconds | The no. 1 complex sample | The no. 2 complex sample |
|---|---|---|---|---|---|---|---|---|
| **INITIAL TEST FOR F.C. OTELUL GALATI TEAM** | | | | | | | | |
| 1. | A.F. | 5"1 | 6"4 | 28,7" | 49,2" | 10 x | *17,1"* | 18,1" |
| 2. | R.H. | 4"8 | 5"9 | 24,9" | 48,9" | 11 x | *16,5"* | 17,3" |
| 3. | T.B. | 5"9 | 6"2 | 28,4" | 49,5" | 9 x | *16,8"* | 17,6" |
| 4. | C.G. | 5"3 | 6"3 | 29,6" | 49,4" | 11 x | *17,1"* | 18,0" |
| 5. | F.S. | 5"1 | 6"7 | 25,1" | 49,1" | 12 x | *17,2"* | 17,0" |
| 6. | L.T. | 5"2 | 6"6 | 28,7" | 48,5" | 10 x | *16,7"* | 16,8" |
| 7. | P.R. | 4"7 | 5"9 | 24,7" | 48,3" | 13 x | *16,4"* | 17,1" |
| 8. | B.C. | 4"9 | 5"9 | 24,8" | 48,8" | 8 x | *16,2"* | 16,5" |
| 9. | A.L. | 5"2 | 6"2 | 27,9" | 49,1" | 11 x | *17,0"* | 18,1" |
| 10. | S.B. | 5"4 | 6"7 | 24,9" | 48,2" | 13 x | *16,3"* | 16,8" |
| 11. | R.C. | 4"9 | 6"3 | 28,6" | 48,9" | 12 x | *15,9"* | 18,2" |
| 12. | S.P. | 4"8 | 6"8 | 27,6" | 49,3" | 8 x | *16,8"* | 18,7" |
| 13. | P.G. | 5"3 | 6"2 | 27,8" | 48,2" | 11 x | *16,4"* | 16,3" |
| 14. | L.C. | 5"1 | 5"9 | 24,9" | 48,3" | 10 x | *15,5"* | 16,5" |
| 15. | V.R. | 5"0 | 6"7 | 24,8" | 46,7" | 6 x | *16,0"* | 17,4" |
| 16. | Z.P. | 5"4 | 6"5 | 27,3" | 47,5" | 9 x | *16,2"* | 17,8" |
| 17. | B.L. | 4"9 | 6"4 | 25,0" | 47,3" | 8 x | *16,1"* | 16,5" |
| 18. | C.R. | 5"3 | 6"8 | 26,3" | 47,9" | 7 x | *16,6"* | 17,1" |
| $\bar{x}$ | | **5"1** | **6"3** | **26,6"** | **48,6"** | **9,6** | ***16,5"*** | **17,3"** |
| **INTERMEDIATES TEST FOR F.C. OTELUL GALATI TEAM** | | | | | | | | |
| 1. | A.F. | 4"7 | 6"1 | 24,9" | 48,5" | 12 x | 16,5" | *17,5"* |
| 2. | R.H. | 5"0 | 5"8 | 24,6" | 48,2" | 13 x | 16,1" | *16,4"* |
| 3. | T.B. | 5"1 | 6"0 | 25,0" | 48,9" | 11 x | 16,1" | *16,6"* |
| 4. | C.G. | 5"0 | 6"2 | 25,6" | 48,5" | 15 x | 16,3" | *16,6"* |
| 5. | F.S. | 4"4 | 6"6 | 24,6" | 48,3" | 14 x | 16,2" | *17,0"* |
| 6. | L.T. | 4"7 | 6"6 | 25,9" | 47,8" | 11 x | 15,5" | *15,3"* |
| 7. | P.R. | 4"7 | 5"7 | 24,2" | 47,5" | 13 x | 15,8" | *16,2"* |
| 8. | B.C. | 5"1 | 5"8 | 24,3" | 48,5" | 10 x | 15,7" | *15,5"* |
| 9. | A.L. | 5"2 | 6"1 | 26,1" | 48,3" | 15 x | 16,1" | *17,0"* |
| 10. | S.B. | 4"8 | 6"6 | 24,6" | 47,6" | 15 x | 16,1" | *16,0"* |
| 11. | R.C. | 4"7 | 6"0 | 25,7" | 47,0" | 13 x | 15,3" | *17,3"* |
| 12. | S.P. | 5"1 | 6"4 | 26,8" | 48,0" | 10 x | 15,9" | *17,1"* |
| 13. | P.G. | 5"0 | 6"1 | 25,1" | 47,5" | 15 x | 15,8" | *15,2"* |
| 14. | L.C. | 4"8 | 5"9 | 24,1" | 47,3" | 12 x | 14,8" | *15,8"* |
| 15. | V.R. | 5"2 | 6"2 | 24"5 | 46,7" | 8 x | 15,2" | *16,3"* |
| 16. | Z.P. | 4"7 | 6"3 | 24,8" | 47,5" | 12 x | 15,1" | *16,1"* |
| 17. | B.L. | 5"3 | 6"1 | 24,6" | 47,3" | 10 x | 15,8" | *16,1"* |
| 18. | C.R. | 5"3 | 6"5 | 25,1" | 47,9" | 11 x | 16,3" | *16,9"* |
| $\bar{x}$ | | **4"9** | **6"1** | **25,0"** | **47,8"** | **13,6** | ***16,3"*** | **16,3"** |
| **FINAL TEST FOR F.C. OTELUL GALATI TEAM** | | | | | | | | |
| 1. | A.F. | 4"6 | 5"8 | 24,7" | 47,4" | 15 x | *15,9"* | 16,3" |
| 2. | R.H. | 4"5 | 5"5 | 23,9" | 47,3" | 14 x | *15,7"* | 15,5" |
| 3. | T.B. | 4"8 | 5"6 | 24,8" | 47,9" | 11 x | *15,5"* | 15,1" |
| 4. | C.G. | 4"9 | 5"9 | 24,8" | 47,7" | 17 x | *15,5"* | 16,1" |
| 5. | F.S. | 4"8 | 6"1 | 24,4" | 47,7" | 18 x | *15,1"* | 15,2" |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 6. | L.T. | 4"6 | 6"1 | 24,2" | 46,2" | 14 x | *14,9"* | 14,2" |
| 7. | P.R. | 4"6 | 5"4 | 23,9" | 46,8" | 14 x | *15,0"* | 15,3" |
| 8. | B.C. | 4"5 | 5"3 | 24,8" | 48,2" | 11 x | *14,1"* | 14,6" |
| 9. | A.L. | 4"8 | 5"9 | 23,8" | 46,9" | 17 x | *15,8"* | 16,3" |
| 10. | S.B. | 4"9 | 6"2 | 24,1" | 46,5" | 16 x | *15,5"* | 16,1" |
| 11. | R.C. | 4"7 | 5"7 | 24,8" | 46,3" | 13 x | *14,5"* | 17,0" |
| 12. | S.P. | 4"4 | 6"0 | 25,0" | 47,2" | 12 x | *15,0"* | 16,2" |
| 13. | P.G. | 4"8 | 5"8 | 24,5" | 46,5" | 16 x | *15,1"* | 14,4" |
| 14. | L.C. | 4"7 | 5"5 | 23,7" | 46,1" | 16 x | *14,6"* | 15,1" |
| 15. | V.R. | 4"6 | 5"9 | 24,2" | 45,9" | 9 x | *15,0"* | 15,6" |
| 16. | Z.P. | 4"9 | 6"0 | 24,3" | 46,7" | 13 x | *14,8"* | 16,3" |
| 17. | B.L. | 4"5 | 5"8 | 24,4" | 46,9" | 11 x | *15,5"* | 15,9" |
| 18. | C.R. | 4"9 | 6"3 | 25,1" | 47,2" | 11 x | *16,0"* | 16,5" |
| $\bar{x}$ | | **4"6** | **5"8** | **24,4"** | **46,9"** | **13,7** | ***15,2"*** | **15,6"** |

For to made a forecast concerning the averages of the driving levels, we must to establish the type of function reflected by the values. In this sense, we apply the method of the coefficients for to study the variation, the real method of selection for the best model of tendency and we consider the year from the middle of the series for each factor, as origin of calculation, while through the achievement of the substitution $\sum_{i=-m}^{m} t_i = 0$.

● In the case of $X$ factor = *the average for 30 m dash*:

- if we formulate the null hypothesis $H_0$: which mentions the assumption of the existence for the trend model concerning $X$ factor as being $x_{t_i} = a + b \cdot t_i$, then the parametres $a$ and $b$ of the adjusted linear function can be calculated by means of the linear regression:

$$S = \sum_{i=1}^{n}(x_i - x_{ti})^2 = \min \Leftrightarrow S = \sum_{i=1}^{n}(x_i - a - bt_i)^2 = \min$$

$$\begin{cases} \dfrac{\partial S}{\partial a} = 0 \\ \dfrac{\partial S}{\partial b} = 0 \end{cases} \Rightarrow \begin{cases} 2\sum_{1=1}^{n}(x_i - a - bt_i)(-1) = 0 / (-\dfrac{1}{2}) \\ 2\sum_{1=1}^{n}(x_i - a - bt_i)(-t_i) = 0 / (-\dfrac{1}{2}) \end{cases} \Rightarrow \begin{cases} na + b\sum_{i=1}^{n} t_i = \sum_{i=1}^{n} x_i \\ a\sum_{i=1}^{n} t_i + b\sum_{i=1}^{n} t_i^2 = \sum_{i=1}^{n} x_i t_i \Rightarrow \\ \sum_{i=1}^{n} t_i = 0 \end{cases}$$

$$a = \frac{\begin{vmatrix} \sum_{i=1}^{n} x_i & \sum_{i=1}^{n} t_i \\ \sum_{i=1}^{n} x_i t_i & \sum_{i=1}^{n} t_i^2 \end{vmatrix}}{\begin{vmatrix} n & \sum_{i=1}^{n} t_i \\ \sum_{i=1}^{n} t_i & \sum_{i=1}^{n} t_i^2 \end{vmatrix}} = \frac{\begin{vmatrix} \sum_{i=1}^{n} x_i & 0 \\ \sum_{i=1}^{n} x_i t_i & \sum_{i=1}^{n} t_i^2 \end{vmatrix}}{\begin{vmatrix} n & 0 \\ 0 & \sum_{i=1}^{n} t_i^2 \end{vmatrix}} = \frac{\sum_{i=1}^{n} x \sum_{i=1}^{n} t_i^2{}_i}{n\sum_{i=1}^{n} t_i^2} = \frac{\sum_{i=1}^{n} x_i}{n} \qquad b = \frac{\begin{vmatrix} n & \sum_{-m}^{m} x_i \\ \sum_{-m}^{m} t_i & \sum_{-m}^{m} x_i t_i \end{vmatrix}}{\begin{vmatrix} n & \sum_{-m}^{m} t_i \\ \sum_{-m}^{m} t_i & \sum_{-m}^{m} t_i^2 \end{vmatrix}} = \frac{\begin{vmatrix} n & \sum_{-m}^{m} x_i \\ 0 & \sum_{-m}^{m} x_i t_i \end{vmatrix}}{\begin{vmatrix} n & 0 \\ 0 & \sum_{-m}^{m} t_i^2 \end{vmatrix}} = \frac{n\sum_{-m}^{m} x_i t_i}{n\sum_{-m}^{m} t_i^2} = \frac{\sum_{-m}^{m} x_i t_i}{\sum_{-m}^{m} t_i^2}$$

**Table 2 The estimates of the values for the variation coefficient in the hypothesis concerning the linear evolution of the factor *X= 30 m dash***

| The test | The average concerning 30 m dash ($x_i$) | LINEAR TREND | | | | |
|---|---|---|---|---|---|---|
| | | $t_i$ | $t_i^2$ | $t_i x_i$ | $x_{t_i} = a + bt_i$ | $\lvert x_i - x_{t_i} \rvert$ |
| Initial | 5,1 | -1 | 1 | -5,1 | 5,116666667 | 0,017 |
| Intermediate | 4,9 | 0 | 0 | 0 | 4,866666667 | 0,033 |
| Final | 4,6 | 1 | 1 | 4,6 | 4,616666667 | 0,017 |
| Total | 14,6 | 0 | 2 | -0,5 | 14,6 | 0,067 |

If we calculate the statistical dates for to adjust the liniar function, we obtain for the parametres $a$ and $b$ the values:

$$a = \frac{14{,}6}{3} = 4{,}866666667 \qquad \text{and} \qquad b = \frac{-0{,}5}{2} = -0{,}25$$

Hence, the coefficient of variation for the adjusted linear function is:

$$v_I = \left[ \frac{\sum_{i=-m}^{m} \left| x_i - x_{t_i}^I \right|}{n} : \frac{\sum_{i=-m}^{m} x_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^{m} \left| x_i - x_{t_i}^I \right|}{\sum_{i=-m}^{m} x_i} \cdot 100 = \frac{0{,}076}{14{,}6} \cdot 100 = 0{,}52\%$$

- in the situation of the alternative hypothesis $H_1$ *:* which specifies the assumption of the existence for the trend model concerning *X* factor as being the quadratic function $x_{t_i} = a + b \cdot t_i + ct_i^2$, the parametres *a*, *b* şi *c* of the adjusted quadratic function can be calculated by means of the system:

$$\begin{cases} n \cdot a + c \sum_{i=-m}^{m} t_i^2 = \sum_{i=-m}^{m} x_i \\ b \cdot \sum_{i=-m}^{m} t_i^2 = \sum_{i=-m}^{m} t_i \cdot x_i \\ a \cdot \sum_{i=-m}^{m} t_i^2 + c \sum_{i=-m}^{m} t_i^4 = \sum_{i=-m}^{m} t_i^2 \cdot x_i \end{cases}$$

Consequently, $a = \frac{\sum_{i=-m}^{m} t_i^4 \cdot \sum_{i=-m}^{m} x_i - \sum_{i=-m}^{m} t_i^2 \cdot \sum_{i=-m}^{m} t_i^2 \cdot x_i}{n \cdot \sum_{i=-m}^{m} t_i^4 - (\sum_{i=-m}^{m} t_i^2)^2}$; $b = \frac{\sum_{i=-m}^{m} t_i \cdot x_i}{\sum_{i=-m}^{m} t_i^2}$; $c = \frac{n \cdot \sum_{i=-m}^{m} t_i^2 \cdot x_i - \sum_{i=-m}^{m} t_i^2 \cdot \sum_{i=-m}^{m} x_i}{n \cdot \sum_{i=-m}^{m} t_i^4 - (\sum_{i=-m}^{m} t_i^2)^2}$

**Table 3 The estimates of the values for the variation coefficient in the hypothesis concerning the quadratic evolution of the factor *X= 30 m dash***

| The test | The average concerning 30 m dash ($x_i$) | PARABOLIC TREND | | | | |
|---|---|---|---|---|---|---|
| | | $t_i^2$ | $t_i^4$ | $t_i^2 \cdot x_i$ | $x_{t_i} = a + bt_i + ct_i^2$ | $\left\| x_i - x_{t_i} \right\|$ |
| Initial | 5,1 | 1 | 1 | 5,1 | 5,1 | 0 |
| Intermediate | 4,9 | 0 | 0 | 0 | 4,9 | 0 |
| Final | 4,6 | 1 | 1 | 4,6 | 4,6 | 0 |
| Total | 14,6 | 2 | 2 | 9,7 | 14,6 | 0 |

In this way, if we calculate the statistical dates for to adjust the second function, we obtain for the parametres *a*, *b* and *c* the next values:

$$a = \frac{2 \cdot 14{,}6 - 2 \cdot 9{,}7}{3 \cdot 2 - (2)^2} = 4{,}9\,;\; b = \frac{-0{,}5}{2} = -0{,}25\,;\; c = \frac{3 \cdot 9{,}7 - 2 \cdot 14{,}6}{3 \cdot 2 - (2)^2} = -0{,}05$$

So, the coefficient of variation for the adjusted quadratic function has the value:

$$v_{II} = \left[ \frac{\sum_{i=-m}^{m} \left| x_i - x_{t_i}^{II} \right|}{n} : \frac{\sum_{i=-m}^{m} x_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^{m} \left| x_i - x_{t_i}^{II} \right|}{\sum_{i=-m}^{m} x_i} \cdot 100 = \frac{0}{14{,}6} \cdot 100 = 0\%$$

**-** in the case of the alternative hypothesis $H_2$*:* which describes the supposition the assumption of the existence for the trend model concerning *X* factor right the exponential function $x_{t_i} = ab^{t_i}$, then the parametres *a* and *b* of the adjusted exponential function can be calculated by means of the next system:

$$\begin{cases} n \cdot \lg a = \sum_{i=-m}^{m} \lg x_i \\ \lg b \cdot \sum_{i=-m}^{m} t_i^2 = \sum_{i=-m}^{m} t_i \cdot \lg x_i \end{cases} \Rightarrow \quad \lg a = \frac{\sum_{i=-m}^{m} \lg x_i}{n} \quad \text{and} \quad \lg b = \frac{\sum_{i=-m}^{m} t_i \cdot \lg x_i}{\sum_{i=-m}^{m} t_i^2}$$

**Table 4 The estimates of the values for the variation coefficient in the hypothesis concerning the exponential evolution of *X* factor = *30 m dash***

| The test | The average concerning 30 m dash ($x_i$) | EXPONENTIAL TREND | | | | | |
|---|---|---|---|---|---|---|---|
| | | $\lg x_i$ | $t_i$ | $t_i \lg x_i$ | $\lg x_{t_i} = \lg a + t_i \cdot \lg b$ | $x_{t_i} = ab^{t_i}$ | $\lvert x_i - x_{t_i} \rvert$ |
| Initial | 5,1 | 0,707570176 | -1 | -0,707570176 | 0,709247534 | 5,119735610 | 0,020 |
| Intermediate | 4,9 | 0,690196080 | 0 | 0 | 0,688413620 | 4,862295645 | 0,038 |
| Final | 4,6 | 0,662757831 | 1 | 0,662757831 | 0,664435190 | 4,617800751 | 0,018 |
| Total | 14,6 | 2,060524087 | | -0,044812344 | | | 0,076 |

Consequently, if we calculate the statistical dates for to adjust the exponential function, we obtain for the parametres $a$ and $b$ the values:

$$\lg a = \frac{2{,}060524087}{3} = 0{,}686841362$$

$$\lg b = \frac{-0{,}044812344}{2} = -0{,}022406172$$

Accordingly, the coefficient of variation for the adjusted exponential function has the next value:

$$v_{\exp} = \left[ \frac{\sum_{i=-m}^{m} \left| x_i - x_{t_i}^{\exp} \right|}{n} : \frac{\sum_{i=-m}^{m} x_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^{m} \left| x_i - x_{t_i}^{\exp} \right|}{\sum_{i=-m}^{m} x_i} \cdot 100 = \frac{0{,}076}{14{,}6} \cdot 100 = 0{,}52\%$$

We observe that: $v_{II} = 0\% < v_I = 0{,}46\% < v_{\exp} = 0{,}52\%$

Therefore, the path followed by *X* factor, *30 m dash*, is an quadratic model of shape $x_{t_i} = a + b \cdot t_i + ct_i^2$.

Analogous to the methodology previously described, we determine the paths followed by the factors which reflect the next tests:

**Table 5 The paths followed by the factors**

| Tests | The „Coefficients of Variation Method" | The paths followed by factors |
|---|---|---|
| **X = 30 m dash** | $v_{II} = 0\% < v_I = 0{,}46\% < v_{\exp} = 0{,}52\%$ | $x_{t_i} = a + b \cdot t_i + ct_i^2$ (quadratic model) |
| **Y = 30 m dash with the ball** | $v_{II} = 0\% < v_I = 0{,}37\% < v_{\exp} = 1{,}11\%$ | $y_{t_i} = a + b \cdot t_i + ct_i^2$ (quadratic model) |
| **Z = the driving of the ball through milestones** | $v_{\exp} = 0{,}84\% < v_{II} = 32{,}9\% < v_I = 33{,}33\%$ | $z_{t_i} = ab^{t_i}$ (exponential model) |
| $\alpha$ **= 3 racing in penalty area** | $v_{II} = 0\% < v_I = 0{,}047\% < v_{\exp} = 0{,}054\%$ | $\alpha_{t_i} = a + b \cdot t_i + ct_i^2$ (quadratic model) |

| | | |
|---|---|---|
| $\beta$ = the hitting of the hanged ball with the head in 15 seconds | $v_{II} = 0\% < v_I = 7{,}046\% < v_{\exp} = 7{,}65\%$ | $\beta_{t_i} = a + b \cdot t_i + ct_i^2$ (quadratic model) |
| $\omega$ = the no. 1 complex sample | $v_{II} = 0\% < v_I = 1{,}25\% < v_{\exp} = 1{,}28\%$ | $\omega_{t_i} = a + b \cdot t_i + ct_i^2$ (quadratic model) |
| $\xi$ = the no. 2 complex sample | $v_{II} = 0\% < v_I = 0{,}41\% < v_{\exp} = 1{,}86\%$ | $\xi_{t_i} = a + b \cdot t_i + ct_i^2$ (quadratic model) |

**Table 6 The forecasts concerning the evolutions of the values for the averages calculated in the case of the tests regarding the increase of the game speed**

| Tests | The forecasts of the averages (t+1 period) |
|---|---|
| 30 m dash | $x_{t_i} = a + b \cdot t_i + ct_i^2 = 4{,}9 + (-0{,}25) \cdot 2 + (-0{,}05) \cdot 2^2 = 4{,}2$ sec. |
| 30 m dash with the ball | $y_{t_i} = a + b \cdot t_i + ct_i^2 = 6{,}1 + (-0{,}25) \cdot 2 + (-0{,}05) \cdot 2^2 = 5{,}4$ sec |
| The driving of the ball through milestones | $z_{t_i} = ab^{t_i} \Leftrightarrow \lg z_{t_i} = \lg a + t_i \lg b \Rightarrow$ $\lg z_{t_i} = 1{,}403403824 + 2 \cdot (-0{,}018745905) = 1{,}365912014 \Rightarrow z_{t_i} = 23{,}2$ |
| 3 racing in penalty area | $\alpha_{t_i} = a + b \cdot t_i + ct_i^2 = 47{,}8 + (-0{,}85) \cdot 2 + (-0{,}05) \cdot 2^2 = 45{,}9$ |
| The hitting of the hanged ball with the head in 15 seconds | $\beta_{t_i} = a + b \cdot t_i + ct_i^2 = 13{,}6 + (2{,}05) \cdot 2 + (-1{,}95) \cdot 2^2 = 9{,}9$ |
| The no. 1 complex sample | $\omega_{t_i} = a + b \cdot t_i + ct_i^2 = 16{,}3 + (-0{,}65) \cdot 2 + (-0{,}45) \cdot 2^2 = 13{,}2$ |
| The no. 2 complex sample | $\xi_{t_i} = a + b \cdot t_i + ct_i^2 = 16{,}3 + (-0{,}85) \cdot 2 + (0{,}15) \cdot 2^2 = 15{,}2$ |

## CONCLUSIONS

- The research conducted at F.C. Otelul Galati confirmed the effectiveness of methods and means for to increase the game speed of the players, because the results of the research were positive, the progress between the initial and final tests being visible. This is emphasized and statistical analysis.
- The game speed is a significant component of the football game. In this sense, if the game speed of the players is more great, the ball runs more fast and in this way it reflects a feature of the modern football [1].

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