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Nanotechnology and Drones, „Boom-Art" in the Advanced Tech

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ABSTRACT

The nanotechnology and the drones represent two zones of great interest in many countries which have as aim only one vector, namely the advance to high quotas of the science. The purposes of this scientific approach follow to present for the lovers of the nanotechnology and for the passionates of drones, a „smart display" which offer them the informations about the immediate future concerning the worldwide market values of the nanotechnology, respectively the worldwide consumptions and the worldwide revenues as effects of the marketing of drones.

1. Introduction

The nanotechnology managed to display as through the symbiosis of the science with the research, it „sculpts" art. The shapes of the nanotechnology have as „scoreline" the productions of devices and materials at atomic and molecular scale. New performances in nanotechnology are amazing: nanostructured rubber which cans to substitute the human tissue, heart attack supervised on chip, nanoscale device which cans to produce giant power terahertz concerning the waves, fascinating magnets with sounds, nanoscale magnetic vortex which produces chaos, device which parrots the brain cells utilized in the process concerning the human vision, 3D printed sensors which can to generate a breath test in the diabetic zone of the population or nanomaterials which can be used in the process of localization for the early cancer. In the first level of this original approach, we can „savour" the arsenal of techniques which estimates the market value of the worldwide nanotechnology in 2020. In the second step, we make acquaintance with the „protocol" which describes the identification of the worldwide consumption of drones, in 2020. In the third step, we meet the „technology" which serves at the selection value concerning the worldwide revenue obtained through the marketing of drones, in the same year. For to shape these targets we ticked and used the method the prognosis which was positioned in the value by the „Least Squares Method". The patent of innovation concerning „Least Squares Method" is achieved in 1823, by Johann Carl Friedrich Gauss. Through this instrument, we have the possibility to „touch" the „physiognomies" which belong to the equations's parameters and at the same time, we can to make previsions of the phenomenons focused in our researchs.

2. The mathematical design which reflects the estimation in 2020 concerning the market value of the worldwide nanotechnology

Table 1. The ranking regarding the worldwide market values regarding the nanotechnology, in 2010-2019

YEARS	THE WORLDWIDE MARKET VALUES CONCERNING THE NANOTECHNOLOGY (billions $) (ξ_i)
2010	15,7
2011	20,1
2012	20,7
2013	22,9
2014	26,0

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2015	**27,0**
2016	**36,2**
2017	**48,9**
2018	**56,3**
2019	**64,2**

Source: „Statista Portal the United States of America"

- if the „portfolio of the mathematical operations" for the ξ variable, where ξ = **the market values of the worldwide nanotechnology,** provides a linear itinerary $\xi_{t_i} = a + b \cdot t_i$, *a* and *b* will be [5]:

$$a = \frac{\begin{vmatrix} \sum_{i=1}^{n} \xi_i & \sum_{i=1}^{n} t_i \\ \sum_{i=1}^{n} \xi_i t_i & \sum_{i=1}^{n} t_i^{\,2} \end{vmatrix}}{\begin{vmatrix} n & \sum_{i=1}^{n} t_i \\ \sum_{i=1}^{n} t_i & \sum_{i=1}^{n} t_i^{\,2} \end{vmatrix}} = \frac{\sum_{i=1}^{n} \xi_i \sum_{i=1}^{n} t_i^{\,2} - \sum_{i=1}^{n} \xi_i t_i \sum_{i=1}^{n} t_i}{n \sum_{i=1}^{n} t_i^{\,2} - \left(\sum_{i=1}^{n} t_i \right)^2} \qquad b = \frac{\begin{vmatrix} n & \sum_{i=1}^{n} \xi_i \\ \sum_{i=1}^{n} t_i & \sum_{i=1}^{n} \xi_i t_i \end{vmatrix}}{\begin{vmatrix} n & \sum_{i=1}^{n} t_i \\ \sum_{i=1}^{n} t_i & \sum_{i=1}^{n} t_i^{\,2} \end{vmatrix}} = \frac{n \sum_{i=1}^{n} \xi_i t_i - \sum_{i=1}^{n} t_i \sum_{i=1}^{n} \xi_i}{n \sum_{i=1}^{n} t_i^{\,2} - \left(\sum_{i=1}^{n} t_i \right)^2}$$

Table 2. The rank regarding the worldwide market values of the nanotechnology, if this brings forward a linear itinerary

YEARS	THE WORLDWIDE MARKET VALUES CONCERNING THE NANOTECHNOLOGY (billions $) (ξ_i)	LINEAR TENDENCY				
		t_i	t_i^2	$t_i \xi_i$	$\xi_{t_i} = a + bt_i$	$\lvert \xi_i - \xi_{t_i} \rvert$
2010	**15,7**	-5	25	-78,5	11,09545455	4,6
2011	**20,1**	-4	16	-80,4	15,63636364	4,5
2012	**20,7**	-3	9	-62,1	20,17727273	0,5
2013	**22,9**	-2	4	-45,8	24,71818182	1,8
2014	**26,0**	-1	1	-26,0	29,25909091	3,3
2015	**27,0**	+1	1	+27,0	38,34090909	11,3
2016	**36,2**	+2	4	+72,4	42,88181818	6,7
2017	**48,9**	+3	9	+146,7	47,42272727	1,5
2018	**56,3**	+4	16	+225,2	51,96363636	4,3
2019	**64,2**	+5	25	+321,0	56,50454546	7,7
TOTAL	**338**		110	499,5	338	46,2

$$a = \frac{338 \cdot 110 - 499{,}5 \cdot 0}{10 \cdot 110 - 0^2} = 33{,}8$$

$$b = \frac{10 \cdot 499{,}5 - 0 \cdot 338}{10 \cdot 110 - 0^2} = 4{,}540909091$$

$$v_I = \left[\frac{\sum_{i=1}^{m} \left| \xi_i - \xi_{t_i}^I \right|}{n} : \frac{\sum_{i=1}^{m} \xi_i}{n} \right] \cdot 100 = \frac{\sum_{i=1}^{m} \left| \xi_i - \xi_{t_i}^I \right|}{\sum_{i=1}^{m} \xi_i} \cdot 100 = \frac{46{,}2}{338} \cdot 100 = 13{,}67\%$$

- if the „portfolio of the mathematical operations" for ξ variable, where ξ = **the market values of the worldwide nanotechnology,** provides a parabolic itinerary $\xi_{t_i} = a + b \cdot t_i + ct_i^2$, *a* and *b* will be [5]:

Table 3. The rank concerning the worlwide market values of the nanotechnology, if this brings forward a quadratic itinerary

YEARS	THE WORLDWIDE MARKET VALUES CONCERNING THE NANOTECHNOLOGY (billions $) (ξ_i)	PARABOLIC TENDENCY						
		t_i	t_i^2	t_i^3	t_i^4	$t_i^2\xi_i$	$\xi_{t_i} = a + bt_i + ct_i^2$	$\lvert\xi_i - \xi_{t_i}\rvert$
2010	**15,7**	-5	25	-125	625	392.5	-24,61016045	40,310
2011	**20,1**	-4	16	-64	256	321,6	2,884358276	17,216
2012	**20,7**	-3	9	-27	81	186,3	25,27807486	4,587
2013	**22,9**	-2	4	-8	16	91,6	42,57098930	19,671
2014	**26,0**	-1	1	-1	1	26,0	54,76310160	28,763
2015	**27,0**	+1	1	+1	1	27,0	63,84491978	36,845
2016	**36,2**	+2	4	+8	16	72,4	60,73462566	24,535
2017	**48,9**	+3	9	+27	81	146,7	52,52352940	3,624
2018	**56,3**	+4	16	+64	256	225,2	39,21163100	17,089
2019	**64,2**	+5	25	+125	625	321,0	20,79893047	43,401
TOTAL	**338**		110		1958	1810,3	337,9999999	236,041

$$a = \frac{\sum_{i=1}^{n} t_i^4 \sum_{i=1}^{n} \xi_i - \sum_{i=1}^{n} t_i^2 \sum_{i=1}^{n} t_i^2 \cdot \xi_i}{n\sum_{i=1}^{n} t_i^{\,4} - \left(\sum_{i=1}^{n} t_i^2\right)^2} \quad ; \quad b = \frac{\sum_{i=1}^{n} \xi_i t_i}{\sum_{i=1}^{n} t_i^{\,2}} \quad ; \quad c = \frac{n \cdot \sum_{i=1}^{n} t_i^2 \cdot \xi_i - \sum_{i=1}^{n} t_i^2 \cdot \sum_{i=1}^{n} \xi_i}{n\sum_{i=1}^{n} t_i^{\,4} - \left(\sum_{i=1}^{n} t_i^2\right)^2}$$

$$a = \frac{\sum_{i=1}^{n} t_i^4 \sum_{i=1}^{n} \xi_i - \sum_{i=1}^{n} t_i^2 \sum_{i=1}^{n} t_i^2 \cdot \xi_i}{n\sum_{i=1}^{n} t_i^{\,4} - \left(\sum_{i=1}^{n} t_i^2\right)^2} = \frac{1958 \cdot 338 - 110 \cdot 1810{,}3}{10 \cdot 1958 - 110^2} = 61{,}85441176$$

$$b = \frac{\sum_{i=1}^{n} \xi_i t_i}{\sum_{i=1}^{n} t_i^{\,2}} = \frac{236}{110} = 4{,}540909091$$

$$c = \frac{n \cdot \sum_{i=1}^{n} t_i^2 \cdot \xi_i - \sum_{i=1}^{n} t_i^2 \cdot \sum_{i=1}^{n} \xi_i}{n\sum_{i=1}^{n} t_i^{\,4} - \left(\sum_{i=1}^{n} t_i^2\right)^2} = \frac{10 \cdot 1810{,}3 - 110 \cdot 338}{10 \cdot 1958 - 110^2} = -2{,}55040107$$

$$v_{II} = \left[\frac{\sum_{i=1}^{m} \left|\xi_i - \xi_{t_i}^{II}\right|}{n} : \frac{\sum_{i=1}^{m} \xi_i}{n}\right] \cdot 100 = \frac{\sum_{i=1}^{m} \left|\xi_i - \xi_{t_i}^{II}\right|}{\sum_{i=1}^{m} \xi_i} \cdot 100 = \frac{236{,}041}{338} \cdot 100 = 69{,}835\%$$

- if the „portfolio of the mathematical operations" for ξ variable, where ξ **= the market values of the worldwide nanotechnology,** provides a parabolic itinerary of three degree $\xi_{t_i} = a + b \cdot t_i + ct_i^2 + dt_i^3$, *a, b, c* and *d* will be [5]:

Table 4 The rank regarding the worldwide market values of the nanotechnology, if this brings forward a quadratic itinerary of three degree

YEARS	THE WORLDWIDE MARKET VALUES CONCERNING THE NANOTECHNOLOGY (billions $) (ξ_i)	PARABOLIC TENDENCY OF THREE DEGREE							
		t_i	t_i^2	t_i^3	t_i^4	t_i^6	$t_i^3\xi_i$	$\xi_{t_i} = a + b \cdot t_i + ct_i^2 + dt_i^3$	$\lvert\xi_i - \xi_{t_i}\rvert$
2010	**15,7**	-5	25	-125	625	15625	-1962,5	-26,69057993	42,391
2011	**20,1**	-4	16	-64	256	4096	-1286,4	3,300442244	16,800
2012	**20,7**	-3	9	-27	81	729	-558,9	26,80371591	6,104
2013	**22,9**	-2	4	-8	16	64	-183,2	44,16597765	21,266
2014	**26,0**	-1	1	-1	1	1	-26	55,73396407	29,734
2015	**27,0**	+1	1	+1	1	1	27	62,87405731	35,874
2016	**36,2**	+2	4	+8	16	64	289,6	59,13963731	22,940
2017	**48,9**	+3	9	+27	81	729	1320,3	50,99788836	2,098
2018	**56,3**	+4	16	+64	256	4096	3603,2	38,79554704	17,504
2019	**64,2**	+5	25	+125	625	15625	8025,0	22,87934995	41,321
TOTAL	**338**		110		1958	41030	9248,1	337,9999999	236,032

$$a = \frac{\sum_{i=1}^{n} t_i^4 \sum_{i=1}^{n} \xi_i - \sum_{i=1}^{n} t_i^2 \sum_{i=1}^{n} t_i^2 \cdot \xi_i}{n\sum_{i=1}^{n} t_i{}^4 - \left(\sum_{i=1}^{n} t_i^2\right)^2} = \frac{1958 \cdot 338 - 110 \cdot 1810,3}{10 \cdot 1958 - 110^2} = 61,85441176$$

$$b = \frac{\sum_{i=1}^{n} t_i^6 \cdot \sum_{i=1}^{n} t_i \cdot \xi_i - \sum_{i=1}^{n} t_i^4 \cdot \sum_{i=1}^{n} t_i^3 \cdot \xi_i}{\sum_{i=1}^{n} t_i{}^2 \cdot \sum_{i=1}^{n} t_i^6 - \left(\sum_{i=1}^{n} t_i^4\right)^2} = \frac{41030 \cdot 499,5 - 1958 \cdot 9248,1}{110 \cdot 41030 - 1958^2} = 3,512257187$$

$$c = \frac{n \cdot \sum_{i=1}^{n} t_i^2 \cdot \xi_i - \sum_{i=1}^{n} t_i^2 \cdot \sum_{i=1}^{n} \xi_i}{n\sum_{i=1}^{n} t_i{}^4 - \left(\sum_{i=1}^{n} t_i^2\right)^2} = \frac{10 \cdot 1810,3 - 110 \cdot 3718}{10 \cdot 1958 - 110^2} = -2,55040107$$

$$d = \frac{\sum_{i=1}^{n} t_i^2 \cdot \sum_{i=1}^{n} t_i^3 \cdot \xi_i - \sum_{i=1}^{n} t_i^4 \cdot \sum_{i=1}^{n} t_i \cdot \xi_i}{\sum_{i=1}^{n} t_i{}^2 \cdot \sum_{i=1}^{n} t_i^6 - \left(\sum_{i=1}^{n} t_i^4\right)^2} = \frac{110 \cdot 9248,1 - 1958 \cdot 499,5}{110 \cdot 41030 - 1958^2} = 0,057789432$$

$$v_{III} = \left[\frac{\sum_{i=1}^{m} \left|\xi_i - \xi_{t_i}^{III}\right|}{n} : \frac{\sum_{i=1}^{m} \xi_i}{n}\right] \cdot 100 = \frac{\sum_{i=1}^{m} \left|\xi_i - \xi_{t_i}^{III}\right|}{\sum_{i=1}^{m} \xi_i} \cdot 100 = \frac{236,032}{338} \cdot 100 = 69,832\%$$

- if the „portfolio of the mathematical operations" for ξ variable, where ξ **= the market values of the worldwide nanotechnology,** provides an exponential itinerary $\xi_{t_i} = ab^{t_i}$, *a* and *b* will be [5]:

$$\lg a = \frac{\begin{vmatrix} \sum_{i=1}^{n} \lg \xi_i & \sum_{i=1}^{n} t_i \\ \sum_{i=1}^{n} t_i \lg \xi_i & \sum_{i=1}^{n} t_i{}^2 \end{vmatrix}}{\begin{vmatrix} n & \sum_{i=1}^{n} t_i \\ \sum_{i=1}^{n} t_i & \sum_{i=1}^{n} t_i{}^2 \end{vmatrix}} = \frac{\sum_{i=1}^{n} \lg \xi_i \sum_{i=1}^{n} t_i{}^2 - \sum_{i=1}^{n} t_i \lg \xi_i \sum_{i=1}^{n} t_i}{n\sum_{i=1}^{n} t_i{}^2 - \left(\sum_{i=1}^{n} t_i\right)^2} \qquad \lg b = \frac{\begin{vmatrix} n & \sum_{i=1}^{n} \lg \xi_i \\ \sum_{i=1}^{n} t_i & \sum_{i=1}^{n} t_i \lg \xi_i \end{vmatrix}}{\begin{vmatrix} n & \sum_{i=1}^{n} t_i \\ \sum_{i=1}^{n} t_i & \sum_{i=1}^{n} t_i{}^2 \end{vmatrix}} = \frac{n \cdot \sum_{i=1}^{n} t_i \lg \xi_i - \sum_{i=1}^{n} \lg \xi_i \sum_{i=1}^{n} t_i}{n\sum_{i=1}^{n} t_i{}^2 - \left(\sum_{i=1}^{n} t_i\right)^2}$$

Table 5 The rank concerning the worldwide market values of the nanotechnology, if this brings forward an exponential itinerary

YEARS	THE WORLDWIDE MARKET VALUES CONCERNING THE NANOTECHNOLOGY (billions $) (ξ_i)	EXPONENTIAL TENDENCY				
		$\lg \xi_i$	$t_i \lg \xi_i$	$\lg \xi_{t_i} = \lg a + t_i \lg b$	$\xi_{t_i} = ab^{t_i}$	$\left\|\xi_i - \xi_{t_i}\right\|$
2010	**15,7**	1,195899652	-5,979498262	1,192665821	15,58325617	0,117
2011	**20,1**	1,303196057	-5,212784230	1,250672558	17,81035426	2,290
2012	**20,7**	1,315970345	-3,947911036	1,308686906	20,35574051	0,344
2013	**22,9**	1,359835482	-2,719670965	1,366701254	23,26490342	0,365
2014	**26,0**	1,414973348	-1,414973348	1,424715602	26,58983253	0,590
2015	**27,0**	1,431363764	+1,431363764	1,540744298	34,73316009	7,733
2016	**36,2**	1,558708571	+3,117417141	1,598758646	39,69708763	3,497
2017	**48,9**	1,689308859	+5,067926577	1,656772994	45,37044031	3,530
2018	**56,3**	1,750508395	+7,002033579	1,714787342	51,85460639	4,445
2019	**64,2**	1,807535028	+9,037675140	1,772801690	59,26546415	4,935
TOTAL	**338**	14,82729950	6,381578360			27,846

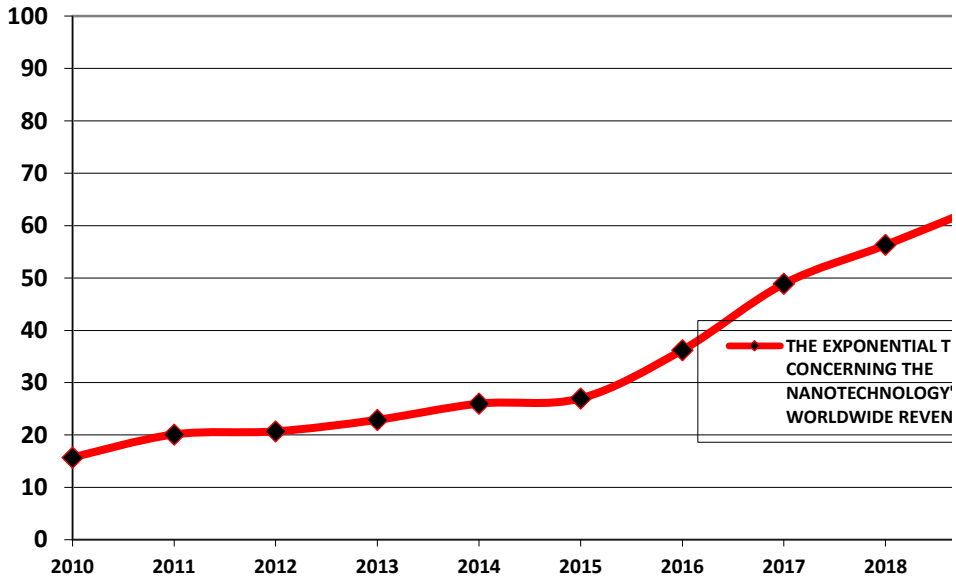
$$\lg a = \frac{14,8272995 \cdot 110 - 6,38157836 \cdot 0}{10 \cdot 110 - 0^2} = 1,48272995$$

$$\lg b = \frac{10 \cdot 6,38157836 - 14,8272995 \cdot 0}{10 \cdot 110 - 0^2} = 0,058014348$$

$$v_{\exp} = \left[\frac{\sum_{i=1}^{n} \left| \xi_i - \xi_{t_i}^{\exp} \right|}{n} : \frac{\sum_{i=1}^{n} \xi_i}{n} \right] \cdot 100 = \frac{\sum_{i=1}^{n} \left| \xi_i - \xi_{t_i}^{\exp} \right|}{\sum_{i=1}^{n} \xi_i} \cdot 100 = \frac{27,846}{338} \cdot 100 = 8,24\%$$

$$v_{\exp} = 8,24\% < v_I = 13,67\% < v_{III} = 69,832\% < v_{II} = 69,835\%$$

The „portfolio of the mathematical operations" which focuses **the worldwide market values concerning the Nanotechnology**, brings forward an exponential route $\xi_{t_i} = ab^{t_i}$



Graph 1 The exponential itinerary for the worldwide market values which stipulate the dynamics of the Nanotechnoly's worldwide revenues

$$\xi_{2020}^{NANOTECHNOLOGY} = 30,389947511,142916093^{6} = 67,73545265 \cong 67,74\_\$billions$$

$$\xi_{2021}^{NANOTECHNOLOGY} = 30,389947511,142916093^{7} = 77,4159389 \cong 77,42\_\$billions$$

3. The mathematical design which exhibits the estimation in 2020 regarding the worldwide consumption of drones

Table 6 The ranking regarding the worldwide consumption of drones, in 2015-2019

YEARS	THE WORLDWIDE CONSUMPTION OF DRONES (thousands) (ω_i)
2015	**6403**
2016	**10244**
2017	**15878**
2018	**23818**
2019	**34536**

Source: „Statista Portal the United States of America"

- if the „portfolio of the mathematical operations" for ω variable, where ω = **the worldwide consumption of drones**, provides a linear itinerary $\omega_{t_i} = a + b \cdot t_i$, *a* and *b* will be [5]:

Table 7 The rank of numbers concerning the worldwide consumption of drones, if this brings forward a linear itinerary

YEARS	THE WORLDWIDE MARKET OF DRONES (thousands) (ω_i)	LINEAR TENDENCY				
		t_i	t_i^2	$t_i\omega_i$	$\omega_{t_i} = a + bt_i$	$\lvert\omega_i - \omega_{t_i}\rvert$
2015	**6403**	-2	4	-12806	4207,8	2195
2016	**10244**	-1	1	-10244	11191,8	948
2017	**15878**	0	0	0	18175,8	2298
2018	**23818**	+1	1	23818	25159,8	1342
2019	**34536**	+2	4	69072	32143,8	2392
TOTAL	**90879**	0	10	69840	**90879**	9175

$$a = \frac{\sum_{i=1}^{n}\omega_i \sum_{i=1}^{n} t_i{}^2 - \sum_{i=1}^{n}\omega_i t_i \sum_{i=1}^{n} t_i}{n\sum_{i=1}^{n} t_i{}^2 - \left(\sum_{i=1}^{n} t_i\right)^2} = \frac{90879 \cdot 10}{5 \cdot 10} = 18175{,}8 \qquad b = \frac{n\sum_{i=1}^{n}\omega_i t_i - \sum_{i=1}^{n} t_i \sum_{i=1}^{n}\omega_i}{n\sum_{i=1}^{n} t_i{}^2 - \left(\sum_{i=1}^{n} t_i\right)^2} = \frac{5 \cdot 69840}{5 \cdot 10} = 6984$$

$$v_I = \left[\frac{\sum_{i=1}^{n}\left|\omega_i - \omega_{t_i}^I\right|}{n} : \frac{\sum_{i=1}^{n}\omega_i}{n}\right] \cdot 100 = \frac{\sum_{i=1}^{n}\left|\omega_i - \omega_{t_i}^I\right|}{\sum_{i=1}^{n}\omega_i} \cdot 100 = \frac{9175}{90879} \cdot 100 = 10{,}10\%$$

- if the „portfolio of the mathematical operations" for ω variable, where ω = **the worldwide consumption of drones**, provides a quadratic itinerary $\omega_{t_i} = a + b \cdot t_i + ct_i^2$, *a* and *b* will be [5]:

Table 8 The rank of numbers regarding the worldwide consumption of drones, if this brings forward a quadratic itinerary

YEARS	THE WORLDWIDE MARKET OF DRONES (thousands) (ω_i)	PARABOLIC TENDENCY					
		t_i	t_i^2	t_i^4	$t_i^2\omega_i$	$\omega_{t_i} = a + bt_i + ct_i^2$	$\lvert\omega_i - \omega_{t_i}\rvert$
2015	**6403**	-2	4	16	25612	6502,085718	99
2016	**10244**	-1	1	1	10244	10044,65715	199
2017	**15878**	0	0	0	0	15881,51429	4
2018	**23818**	+1	1	1	23818	24012,65715	195
2019	**34536**	+2	4	16	138144	34438,08572	98
TOTAL	**90879**	0	10	34	197818	90879	595

$$a=\frac{\sum_{i=1}^{n}t_i^4\sum_{i=1}^{n}\omega_i-\sum_{i=1}^{n}t_i^2\sum_{i=1}^{n}t_i^2\cdot\omega_i}{n\sum_{i=1}^{n}t_i{}^4-\left(\sum_{i=1}^{n}t_i^2\right)^2}=\frac{34\cdot 90879-10\cdot 197818}{5\cdot 34-10^2}=15881{,}51429 \qquad b=\frac{\sum_{i=1}^{n}\omega_i t_i}{\sum_{i=1}^{n}t_i{}^2}=\frac{69840}{10}=6984$$

$$c=\frac{n\cdot\sum_{i=1}^{n}t_i^2\cdot\omega_i-\sum_{i=1}^{n}t_i^2\cdot\sum_{i=1}^{n}\omega_i}{n\sum_{i=1}^{n}t_i{}^4-\left(\sum_{i=1}^{n}t_i^2\right)^2}=\frac{5\cdot 197818-10\cdot 90879}{5\cdot 34-10^2}=1147{,}142857$$

$$v_{II}=\left[\frac{\sum_{i=1}^{n}\left|\omega_i-\omega_{t_i}^{II}\right|}{n}:\frac{\sum_{i=1}^{n}\omega_i}{n}\right]\cdot 100=\frac{\sum_{i=1}^{n}\left|\omega_i-\omega_{t_i}^{II}\right|}{\sum_{i=1}^{n}\omega_i}\cdot 100=\frac{595}{90879}\cdot 100=0{,}66\%$$

- if the „portfolio of the mathematical operations" for ω variable, where ω **= the worldwide consumption of drones,** provides a parabolic itinerary of three degree $\omega_{t_i}=a+b\cdot t_i+ct_i^2+dt_i^3$, *a, b, c* and *d* will be [5]:

Table 9 The rank of numbers concerning the worldwide consumption of drones, if this brings forward a quadratic itinerary of three degree

YEARS	THE WORLDWIDE MARKET OF DRONES (thousands) (ω_i)	PARABOLIC TENDENCY OF THREE DEGREE							
		t_i	t_i^2	t_i^3	t_i^4	t_i^6	$t_i^3\omega_i$	$\omega_{t_i}=a+b\cdot t_i+ct_i^2+dt_i^3$	$\left\|\omega_i-\omega_{t_i}\right\|$
2015	**6403**	-2	4	-8	16	64	-51224	6403,585717	1
2016	**10244**	-1	1	-1	1	1	-10244	10241,65715	2
2017	**15878**	0	0	0	0	0	0	15881,51429	4
2018	**23818**	+1	1	+1	1	1	23818	23815,65715	2
2019	**34536**	+2	4	+8	16	64	276288	34536,58572	1
TOTAL	**90879**	0	10	0	34	130	238638	90879	10

$$a=\frac{\sum_{i=1}^{n}t_i^4\sum_{i=1}^{n}\omega_i-\sum_{i=1}^{n}t_i^2\sum_{i=1}^{n}t_i^2\cdot\omega_i}{n\sum_{i=1}^{n}t_i{}^4-\left(\sum_{i=1}^{n}t_i^2\right)^2}=\frac{34\cdot 90879-10\cdot 197818}{5\cdot 34-10^2}=15881{,}51429$$

$$b=\frac{\sum_{i=1}^{n}t_i^6\cdot\sum_{i=1}^{n}t_i\cdot\omega_i-\sum_{i=1}^{n}t_i^4\cdot\sum_{i=1}^{n}t_i^3\cdot\omega_i}{\sum_{i=1}^{n}t_i{}^2\cdot\sum_{i=1}^{n}t_i^6-\left(\sum_{i=1}^{n}t_i^4\right)^2}=\frac{130\cdot 69840-34\cdot 238638}{10\cdot 130-34^2}=6704{,}916667$$

$$c=\frac{n\cdot\sum_{i=1}^{n}t_i^2\cdot\omega_i-\sum_{i=1}^{n}t_i^2\cdot\sum_{i=1}^{n}\omega_i}{n\sum_{i=1}^{n}t_i{}^4-\left(\sum_{i=1}^{n}t_i^2\right)^2}=\frac{5\cdot 197818-10\cdot 90879}{5\cdot 34-10^2}=1147{,}142857$$

$$d=\frac{\sum_{i=1}^{n}t_i^2\cdot\sum_{i=1}^{n}t_i^3\cdot\omega_i-\sum_{i=1}^{n}t_i^4\cdot\sum_{i=1}^{n}t_i\cdot\omega_i}{\sum_{i=1}^{n}t_i{}^2\cdot\sum_{i=1}^{n}t_i^6-\left(\sum_{i=1}^{n}t_i^4\right)^2}=\frac{10\cdot 238638-34\cdot 69840}{10\cdot 130-34^2}=82{,}08333333$$

$$v_{III}=\left[\frac{\sum_{i=1}^{m}\left|\omega_i-\omega_{t_i}^{III}\right|}{n}:\frac{\sum_{i=1}^{m}\omega_i}{n}\right]\cdot 100=\frac{\sum_{i=1}^{m}\left|\omega_i-\omega_{t_i}^{III}\right|}{\sum_{i=1}^{m}\omega_i}\cdot 100=\frac{10}{90879}\cdot 100=0{,}01\%$$

- if the „portfolio of the mathematical operations" for ω variable, where ω = **the worldwide consumption of drones**, provides an exponential itinerary $\omega_{t_i} = ab^{t_i}$, *a* and *b* will be [5]:

Table 10 The rank of numbers regarding the worldwide consumption of drones, if this brings forward an exponential itinerary

YEARS	THE WORLDWIDE MARKET OF DRONES (thousands) (ω_i)	EXPONENTIAL TENDENCY					
		t_i	$\lg \omega_i$	$t_i \lg \omega_i$	$\lg \omega_{t_i} = \lg a + t_i \lg b$	$\omega_{t_i} = ab^{t_i}$	$\lvert \omega_i - \omega_{t_i} \rvert$
2015	**6403**	-2	3,806383502	-7,612767004	3,820522683	6614,890859	212
2016	**10244**	-1	4,010469570	-4,010469570	4,003543961	10081,93658	162
2017	**15878**	0	4,200795798	0	4,186565239	15366,15604	512
2018	**23818**	+1	4,376905291	4,376905291	4,369586517	15366,15604	398
2019	**34536**	+2	4,538272036	9,076544071	4,552607795	35695,03359	1159
TOTAL	**90879**	0	20,9328262	1,830212788			2443

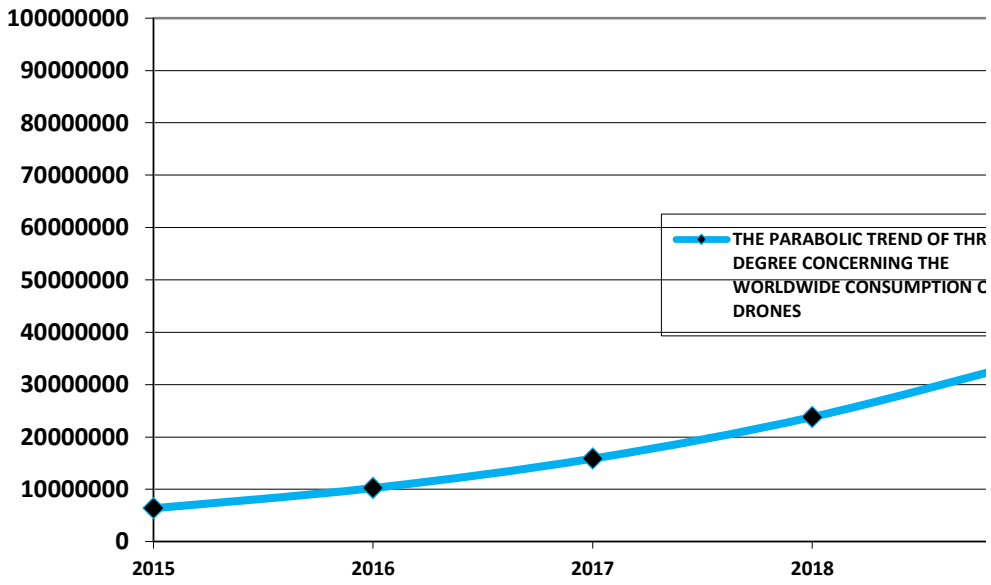
$$\lg a = \frac{\sum_{i=1}^{n} \lg \omega_i \sum_{i=1}^{n} t_i^2 - \sum_{i=1}^{n} t_i \lg \omega_i \sum_{i=1}^{n} t_i}{n\sum_{i=1}^{n} t_i^2 - \left(\sum_{i=1}^{n} t_i\right)^2} = \frac{20,9328262 \cdot 10}{5 \cdot 10} = 4,186565239$$

$$\lg b = \frac{n \cdot \sum_{i=1}^{n} t_i \lg \omega_i - \sum_{i=1}^{n} \lg \omega_i \sum_{i=1}^{n} t_i}{n\sum_{i=1}^{n} t_i^2 - \left(\sum_{i=1}^{n} t_i\right)^2} = \frac{5 \cdot 1,830212788}{5 \cdot 10} = 0,183021278$$

$$v_{\exp} = \left[\frac{\sum_{i=1}^{n} \left| \omega_i - \omega_{t_i}^{\exp} \right|}{n} : \frac{\sum_{i=1}^{n} \omega_i}{n} \right] \cdot 100 = \frac{\sum_{i=1}^{n} \left| \omega_i - \omega_{t_i}^{\exp} \right|}{\sum_{i=1}^{n} \omega_i} \cdot 100 = \frac{2443}{90879} \cdot 100 = 2,69\%$$

$$v_{III} = 0,01\% < v_{II} = 0,66\% < v_{\exp} = 2,69\% < v_I = 10,10\%$$

The „portfolio of the mathematical operations" which supervisas the **worldwide consumption of drones**, brings forward a quadratic itinerary of three degree $\omega_{t_i} = a + b \cdot t_i + ct_i^2 + dt_i^3$



Graph 2 The quadratic itineray of three degree for the values which stipulate the evolution of the worldwide consumption of drones

$$\omega_{2020}^{WORLDWIDE\_DRONES} = 15881{,}51429 + 6704{,}916667 \cdot 3 + 1147{,}142857 \cdot 3^2 + 82{,}08333333 \cdot 3^3 \cong 48537 \cdot 10^3 \cong 49\_millions\_drones$$

$$\omega_{2021}^{WORLDWIDE\_DRONES} = 15881{,}51429 + 6704{,}916667 \cdot 4 + 1147{,}142857 \cdot 4^2 + 82{,}08333333 \cdot 4^3 \cong 66309 \cdot 10^3 \cong 66\_millions\_drones$$

4. The mathematical design which unveils the estimation in 2020 concerning the worldwide revenues obtained through the marketing of drones

Table 6 The ranking for the worlwide revenues concerning the merchandising of drones, in 2015-2019

YEARS	THE WORLDWIDE REVENUES REGARDING THE MARKETING OF DRONES (millions $) $(\wp_i)$
2015	**1865,64**
2016	**2385,29**
2017	**2950,90**
2018	**3528,73**
2019	**4074,31**

Source: „Statista Portal the United States of America"

- if the „portfolio of the mathematical operations" for ω variable, where $\wp$ = **the worlwide revenues concerning the marketing of drones**, provides a linear itinerary $\wp_{t_i} = a + b \cdot t_i$, *a* and *b* will be [5]:

Table 7 The rank of numbers concerning the worlwide revenues concerning the merchandising of drones, if this brings forward a linear itinerary

YEARS	THE WORLDWIDE REVENUES CONCERNING THE DRONES (millions $) $(\wp_i)$	LINEAR TENDENCY				
		t_i	t_i^2	$t_i\wp_i$	$\wp_{t_i} = a + bt_i$	$\lvert\wp_i - \wp_{t_i}\rvert$
2015	**1865,64**	-2	4	-3731,28	1848,822	16,818
2016	**2385,29**	-1	1	-2385,29	2404,898	19,608
2017	**2950,90**	0	0	0	2960,974	10,074
2018	**3528,73**	+1	1	+3528,73	3517,050	11,680
2019	**4074,31**	+2	4	+8148,62	4073,126	1,184
TOTAL	**14804,87**		10	5560,78	**14804,870**	59,364

$$a = \frac{\sum_{i=1}^{n} \wp_i \sum_{i=1}^{n} t_i^{\,2} - \sum_{i=1}^{n} \wp_i t_i \sum_{i=1}^{n} t_i}{n\sum_{i=1}^{n} t_i^{\,2} - \left(\sum_{i=1}^{n} t_i\right)^2} = \frac{14804{,}87 \cdot 10}{5 \cdot 10} = 2960{,}974$$

$$b = \frac{n\sum_{i=1}^{n} \wp_i t_i - \sum_{i=1}^{n} t_i \sum_{i=1}^{n} \wp_i}{n\sum_{i=1}^{n} t_i^{\,2} - \left(\sum_{i=1}^{n} t_i\right)^2} = \frac{5 \cdot 5560{,}78}{5 \cdot 10} = 556{,}076$$

$$v_I = \left[\frac{\sum_{i=1}^{n} \left|\wp_i - \wp_{t_i}^I\right|}{n} : \frac{\sum_{i=1}^{n} \wp_i}{n}\right] \cdot 100 = \frac{\sum_{i=1}^{n} \left|\wp_i - \wp_{t_i}^I\right|}{\sum_{i=1}^{n} \wp_i} \cdot 100 = \frac{59{,}364}{14804{,}87} \cdot 100 = 0{,}4\%$$

- if the „portfolio of the mathematical operations" for $\wp$ variable, where $\wp$ = **the worlwide revenues concerning the marketing of drones**, provides a quadratic itinerary $\wp_{t_i} = a + b \cdot t_i + ct_i^2$, *a* and *b* will be [5]:

Table 8 The rank of numbers regarding the the worlwide revenues concerning the merchandising of drones, if this brings forward a quadratic itinerary

YEARS	THE WORLDWIDE REVENUES CONCERNING THE MERCHANDISING OF DRONES (millions $) $(\wp_i)$	PARABOLIC TENDENCY						
		t_i	t_i^2	t_i^3	t_i^4	$t_i^2\wp_i$	$\wp_{t_i} = a + bt_i + ct_i^2$	$\lvert\wp_i - \wp_{t_i}\rvert$
2015	**1865,64**	-2	4	-8	16	7462,56	1857,976295	7,66
2016	**2385,29**	-1	1	-1	1	2385,29	2400,320857	15,03
2017	**2950,90**	0	0	0	0	0	2951,819714	0,92
2018	**3528,73**	+1	1	+1	1	3528,73	3512,472857	16,26
2019	**4074,31**	+2	4	+8	16	16297,24	4082,280285	7,97
TOTAL	**14804,87**		10		34	29673,82	14804,87	47,84

$$a = \frac{\sum_{i=1}^{n} t_i^4 \sum_{i=1}^{n} \wp_i - \sum_{i=1}^{n} t_i^2 \sum_{i=1}^{n} t_i^2 \cdot \wp_i}{n\sum_{i=1}^{n} t_i{}^4 - \left(\sum_{i=1}^{n} t_i^2\right)^2} = \frac{34 \cdot 14804{,}87 - 10 \cdot 29673{,}82}{5 \cdot 34 - 10^2} = 2951{,}819714$$

$$b = \frac{\sum_{i=1}^{n} \wp_i t_i}{\sum_{i=1}^{n} t_i{}^2} = \frac{5560{,}78}{10} = 556{,}076$$

$$c = \frac{n \cdot \sum_{i=1}^{n} t_i^2 \cdot \wp_i - \sum_{i=1}^{n} t_i^2 \cdot \sum_{i=1}^{n} \wp_i}{n\sum_{i=1}^{n} t_i{}^4 - \left(\sum_{i=1}^{n} t_i^2\right)^2} = \frac{5 \cdot 29673{,}82 - 10 \cdot 14804{,}87}{5 \cdot 34 - 10^2} = 4{,}577142857$$

$$v_{II} = \left[\frac{\sum_{i=1}^{n} \left|\wp_i - \wp_{t_i}^{II}\right|}{n} : \frac{\sum_{i=1}^{n} \wp_i}{n}\right] \cdot 100 = \frac{\sum_{i=1}^{n} \left|\wp_i - \wp_{t_i}^{II}\right|}{\sum_{i=1}^{n} \wp_i} \cdot 100 = \frac{47{,}84}{14804{,}87} \cdot 100 = 0{,}32\%$$

- if the „portfolio of the mathematical operations" for $\wp$ variable, where $\wp$ **= the worlwide revenues concerning the marketing of drones,** provides a parabolic itinerary of three degree $\wp_{t_i} = a + b \cdot t_i + ct_i^2 + dt_i^3$, *a, b, c* and *d* will be [5]:

Table 9 The rank of numbers concerning the the worlwide revenues concerning the merchandising of drones, if this brings forward a quadratic itinerary of three degree

YEARS	THE WORLDWIDE REVENUES CONCERNING THE MERCHANDI-SING OF DRONES (millions $) $(\wp_i)$	PARABOLIC TENDENCY OF THREE DEGREE							
		t_i	t_i^2	t_i^3	t_i^4	t_i^6	$t_i^3\wp_i$	$\wp_{t_i} = a + b \cdot t_i + ct_i^2 + dt_i^3$	$\lvert\wp_i - \wp_{t_i}\rvert$
2015	**1865,64**	-2	4	-8	16	64	-14925,12	1865,793285	0,15
2016	**2385,29**	-1	1	-1	1	1	-2385,29	2384,676857	0,61
2017	**2950,90**	0	0	0	0	0	0	2951,819714	0,92
2018	**3528,73**	+1	1	+1	1	1	+3528,73	3528,116857	0,61
2019	**4074,31**	+2	4	+8	16	64	+32594,48	4074,463285	0,15
TOTAL	**14804,87**		10		34	130	18812,8	14804,87	2,44

$$a=\frac{\sum_{i=1}^{n}t_i^4\sum_{i=1}^{n}\wp_i-\sum_{i=1}^{n}t_i^2\sum_{i=1}^{n}t_i^2\cdot\wp_i}{n\sum_{i=1}^{n}t_i{}^4-\left(\sum_{i=1}^{n}t_i^2\right)^2}=\frac{34\cdot14804{,}87-10\cdot29673{,}82}{5\cdot34-10^2}=2951{,}819714$$

$$b=\frac{\sum_{i=1}^{n}t_i^6\cdot\sum_{i=1}^{n}t_i\cdot\wp_i-\sum_{i=1}^{n}t_i^4\cdot\sum_{i=1}^{n}t_i^3\cdot\wp_i}{\sum_{i=1}^{n}t_i{}^2\cdot\sum_{i=1}^{n}t_i^6-\left(\sum_{i=1}^{n}t_i^4\right)^2}=\frac{130\cdot5560{,}78-34\cdot18812{,}8}{10\cdot130-34^2}=578{,}2375$$

$$c=\frac{n\cdot\sum_{i=1}^{n}t_i^2\cdot\wp_i-\sum_{i=1}^{n}t_i^2\cdot\sum_{i=1}^{n}\wp_i}{n\sum_{i=1}^{n}t_i{}^4-\left(\sum_{i=1}^{n}t_i^2\right)^2}=\frac{5\cdot29673{,}82-10\cdot14804{,}87}{5\cdot34-10^2}=4{,}577142857$$

$$d=\frac{\sum_{i=1}^{n}t_i^2\cdot\sum_{i=1}^{n}t_i^3\cdot\wp_i-\sum_{i=1}^{n}t_i^4\cdot\sum_{i=1}^{n}t_i\cdot\wp_i}{\sum_{i=1}^{n}t_i{}^2\cdot\sum_{i=1}^{n}t_i^6-\left(\sum_{i=1}^{n}t_i^4\right)^2}=\frac{10\cdot18812{,}8-34\cdot5560{,}78}{10\cdot130-34^2}=-6{,}5175$$

$$v_{III}=\left[\frac{\sum_{i=1}^{m}\left|\wp_i-\wp_{t_i}^{III}\right|}{n}:\frac{\sum_{i=1}^{m}\wp_i}{n}\right]\cdot100=\frac{\sum_{i=1}^{m}\left|\wp_i-\wp_{t_i}^{III}\right|}{\sum_{i=1}^{m}\wp_i}\cdot100=\frac{2{,}44}{14804{,}87}\cdot100=0{,}02\%$$

- if the „portfolio of the mathematical operations" for ω variable, where $\wp$ = **the worlwide revenues concerning the marketing of drones**, provides an exponential itinerary $\wp_{t_i}=ab^{t_i}$, *a* and *b* will be [5]:

Table 10 The rank of numbers regarding the worlwide revenues concerning the merchandising of drones, if this brings forward an exponential itinerary

YEARS	THE WORLDWIDE REVENUES CONCERNING THE MERCHANDISING OF DRONES (millions $) $(\wp_i)$	EXPONENTIAL TENDENCY					
		t_i	$\lg\wp_i$	$t_i\lg\wp_i$	$\lg\wp_{t_i}=\lg a+t_i\lg b$	$\wp_{t_i}=ab^{t_i}$	$\left\|\wp_i-\wp_{t_i}\right\|$
2015	**1865,64**	-2	3,270827845	-6,541655689	3,285493307	1929,715597	64,08
2016	**2385,29**	-1	3,377541187	-3,377541187	3,370346256	2346,098576	39,19
2017	**2950,90**	0	3,469954492	0	3,455199205	2852,326291	98,57
2018	**3528,73**	+1	3,547618430	+3,547618430	3,540052154	3467,784922	60,94
2019	**4074,31**	+2	3,610054070	+7,220108140	3,624905103	4216,043693	141,73
TOTAL	**14804,87**		17,27599602	0,848529492			404,51

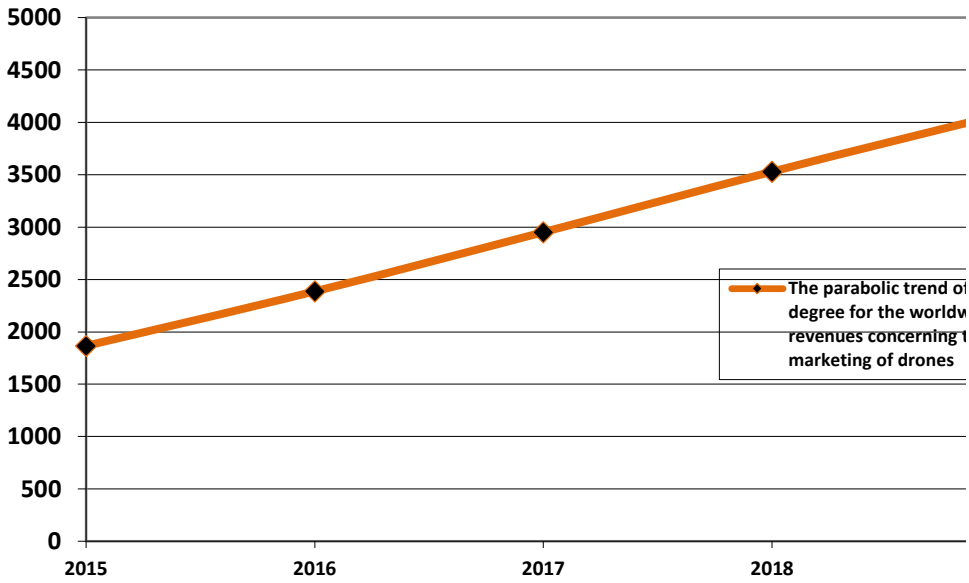
$$\lg a=\frac{\sum_{i=1}^{n}\lg\wp_i\sum_{i=1}^{n}t_i^2-\sum_{i=1}^{n}t_i\lg\wp_i\sum_{i=1}^{n}t_i}{n\sum_{i=1}^{n}t_i{}^2-\left(\sum_{i=1}^{n}t_i\right)^2}=\frac{17{,}27599602\cdot10}{5\cdot10}=3{,}455199205$$

$$\lg b=\frac{n\cdot\sum_{i=1}^{n}t_i\lg\wp_i-\sum_{i=1}^{n}\lg\wp_i\sum_{i=1}^{n}t_i}{n\sum_{i=1}^{n}t_i{}^2-\left(\sum_{i=1}^{n}t_i\right)^2}=\frac{5\cdot0{,}848529492}{5\cdot10}=0{,}0848529492$$

$$v_{\exp}=\left[\frac{\sum_{i=1}^{n}\left|\wp_i-\wp_{t_i}^{\exp}\right|}{n}:\frac{\sum_{i=1}^{n}\wp_i}{n}\right]\cdot100=\frac{\sum_{i=1}^{n}\left|\wp_i-\wp_{t_i}^{\exp}\right|}{\sum_{i=1}^{n}\wp_i}\cdot100=\frac{404{,}51}{14804{,}87}\cdot100=2{,}73\%$$

$$v_{III}=0{,}02\%<v_{II}=0{,}32\%<v_I=0{,}4\%<v_{\exp}=2{,}73\%$$

The „portfolio of the mathematical operations" which focuses **the worldwide revenues concerning the marketing of drones**, brings forward a parabolic itinerary of three degree $\wp_{t_i} = a + b \cdot t_i + ct_i^2 + dt_i^3$



Graph 3 The quadratic itinerary of three degree for the values which stipulate the evolution of the worldwide revenues regarding the marketing of drones

$$\omega_{2020}^{MARKETING\_0F\_DRONES} = 2951{,}819714 + 578{,}2375 \cdot 3 + 4{,}577142857 \cdot 3^2 + (-6{,}5175) \cdot 3^3 \cong 4552\_\$millions$$

$$\omega_{2021}^{MARKETING\_0F\_DRONES} = 2951{,}819714 + 578{,}2375 \cdot 4 + 4{,}577142857 \cdot 4^2 + (-6{,}5175) \cdot 4^3 \cong 4921\_\$millions$$

5. Conclusions

While in 1980, Erick Drexter described the nanotechnology as the engineering which models machines at the molecular scale, robots arms, „tiny" computers comparative to the cells, in our days, we can view another definition concerning the nanotechnology, such as the opinion of the U.S. National Nanotechnology Initiative, which expresses that, whatever entity which is under 100 nanometers, with new properties, represents the nanotechnology. The drones, these amazing small „creatures", modify our perceptions about the „angles" which offer possibilities to make „insertions" in the worldwide stratosphere. There are a lot of drones on worldwide level: drones which perform the remote zapper for to guide the vehicles, police-drones which supervise if the people respect the restrictions of confinement as effects of the Covid 19 virus, mini drones with the roles of weapons used in the conflict zones, such as: Irak, Afghanistan, Lybia, Ukraine, Syria and which can terrify the enemy. In the immediate horizont 2020-2021, we can see as the worldwide market values regarding the nanotechnology rise in 2020 to 67,74 $ billions and in 2021, these rise to 77,42 $ billions. Also, in the same horizont 2020-2021, the worldwide consumptions of drones touch the values of 49 millions in 2020, respectively 66 millions in 2021 and the worldwide revenues concerning the marketing of drones rise to 4552 $ millions in 2020, respectively 4921 $ millions in 2021.

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