



BIR KAMERALI IKKI SILINDRLI JINDA TOLANING SHIKASTLANISHI BO'YICHA OPTIMAL MATEMATIK MODEL TANLASH

Azizov Shuhrat Mamatovich
Mirzakarimov Mirsharoffiddin Mirzaabduraximovich
Namangan muhandislik-texnologiya instituti, O'zbekiston

Anotatsiya: *Excel dasturida. Bir kamerali ikki silindrlı jin mashinasida tolani eng kam shikastlanishga olingan sinovlarni tekshirishni matematik modellashtirish turlari orqali optimal modelni tanlash.*

Kalit so'zlar: *Chiziqli, Ekspontensial, Logarifmik, Polinomial va Darajali modellar, Excel dasturi, Ishchi kamera, Matematik modellashtirish.*

ПОЛУЧЕНИЯ САМОЙ ОПТИМАЛЬНОЙ МАТЕМАТИЧЕСКОЙ МОДЕЛИ ПОВРЕЖДЕНИЯ ВОЛОКНА НА ОДНОКАМЕРНОМ ДВУХ ЦИЛИНДРНОМ ПИЛЬНОМ ДЖИНЕ.

Азизов Шуҳрат Маматович
Мирзакаримов Миршарофиддин Мирзаабдурахимович
Наманганский инженерно-технологический институт, Узбекистан

Аннотация. *Математическое моделирование в программе Excel однокамерного двух цилиндрического джина на наименьшие повреждения волокна. Получения самой оптимальной математической модели приближенный к полученным практическим путем данных.*

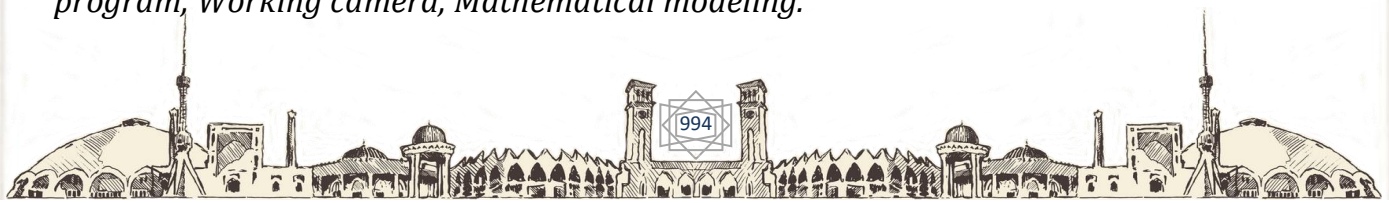
Ключевые слова. *Линейная, Экспоненциальная, Логарифмическая, Полиномиальная и Уровневая модели, Программа Excel, Рабочая камера, Математическое моделирование.*

OBTAINING THE MOST OPTIMAL MATHEMATICAL MODEL OF FIBER DAMAGE ON A SINGLE-CHAMBER TWO-CYLINDER SAW GIN.

Azizov Shuhrat Mamatovich
Mirzakarimov Mirsharoffiddin Mirzaabdurahimovich
Namangan Institute of Engineering and Technology, Uzbekistan

Annotation. *Mathematical modeling in the Excel program of a single-chamber two-cylinder saw gin for the least damage to the fiber. Obtaining the most optimal mathematical model close to the data obtained in a practical way.*

Keywords. *Linear, Exponential, Logarithmic, Polynomial and Level models, Excel program, Working camera, Mathematical modeling.*





Chiziqli model olish (tolaning shikastlanishi bo'yicha)

1. Ekisponensial model olish (tolaning shikastlanishi bo'yicha)
2. Logarifmik model olish (tolaning shikastlanishi bo'yicha)
3. Polinomial model olish (tolaning shikastlanishi bo'yicha)
4. Darajali model olish (tolaning shikastlanishi bo'yicha)

Bir kamerali ikki silindri jin mashinasida kiruvchi omillarni o'zgartirgan holatda excelda qurilmani kiruvchi omillarga qarab optimal joylashish o'lchamlarini aniqlab oldik bunda shikastlanishini kamaytirish uchun bizda grafigimizda sinovlar natijasida eng past shikastlanish 2% bo'lganda ishchi kamera diametri 160 va arrali tsilindrlarni gorizontol o'qqa nisbatan qiyalik joylashuv burchagi 60° ni tashkil etdi. [1-3]

Ushbu olingan natijalarga qarab biz 12 ta tajribaga asoslangan kiruvchi omilni hissobga olgan holda chiquvchi omillarni modellashtirish imkonini beruvchi matematik model loyihalashimiz kerak bo'ladi buning uchun biz avvalgi jadvaldan foydalanamiz [4-6].

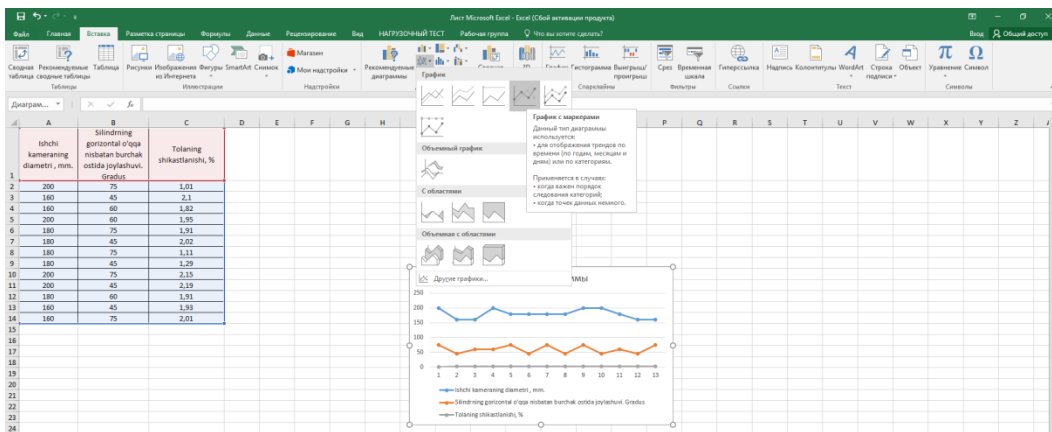
1-Jadval

№	Mashina ish unumdorligi t\soat	Ishchi kameraning diametri , mm.	Silindrning gorizontol o'qqa nisbatan burchak ostida joylashuvi. Gradus	Tolaning shikastlanishi, %
1	3	200	75	1,01
2	2	160	45	2,1
3	2	160	60	1,82
4	3	200	60	1,95
5	3	180	75	1,91
6	2	180	45	2,02
7	2	180	75	1,11
8	3	180	45	1,29
9	2,5	200	75	2,15
10	2,5	200	45	2,19
11	2,5	180	60	1,91
12	2,5	160	45	1,93
13	2,5	160	75	2,01

1. Chiziqli model olish (tolaning shikastlanishi bo'yicha)

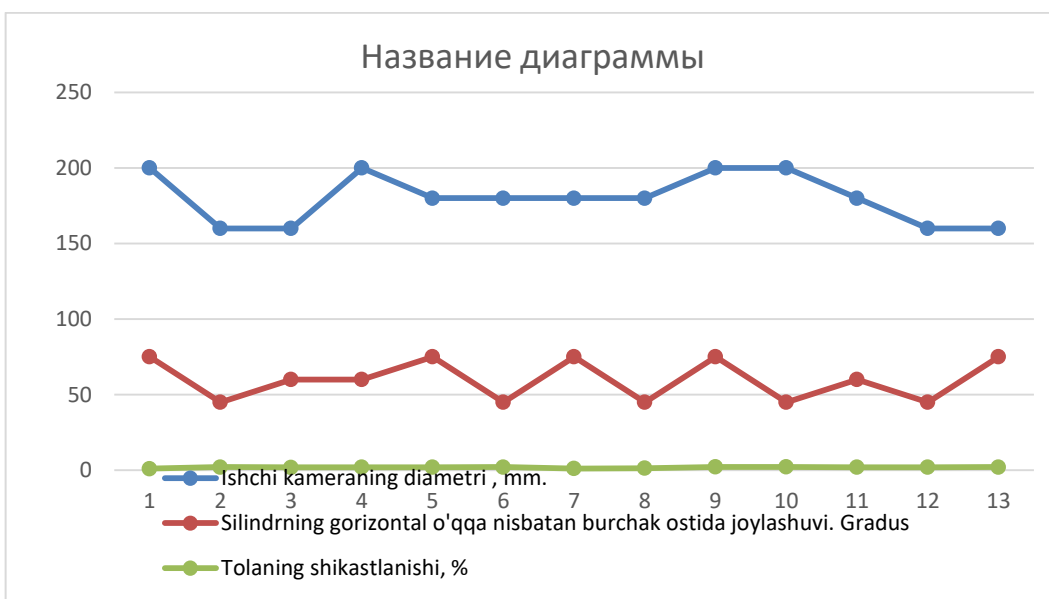
Chiziqli model olish uchun biz excel dasturiga kiramiz va 1-jadvalni joylashtiramiz



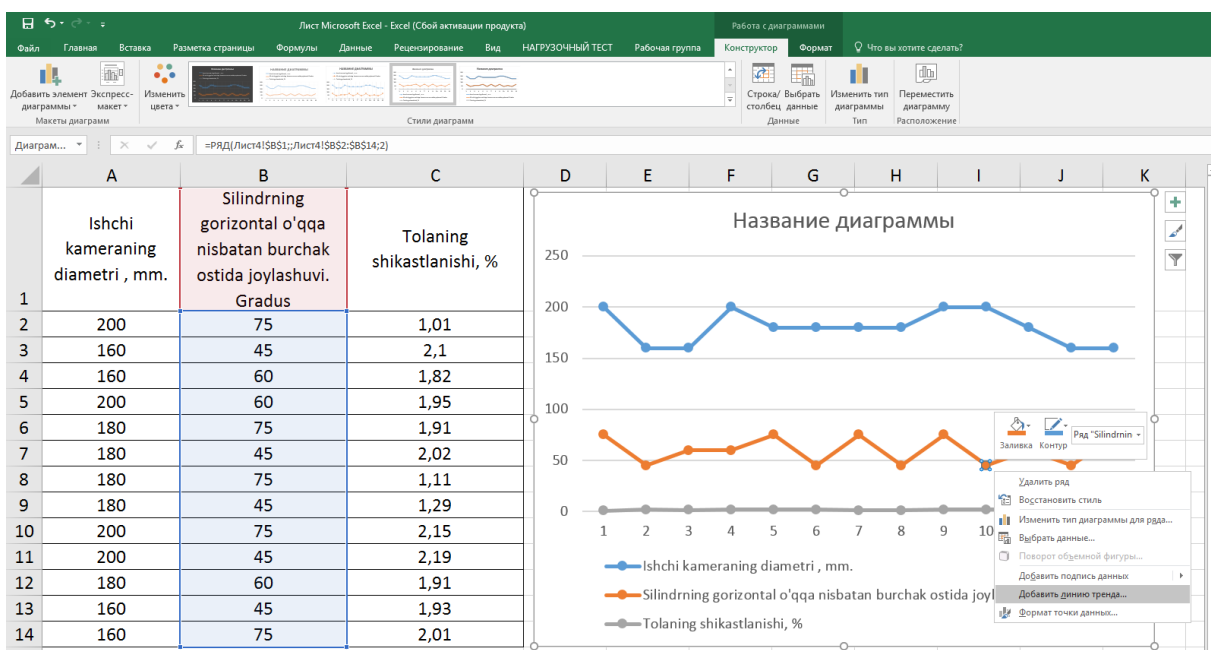


1-rasm

Menyuda (vstavka) ni tanlab (grafik s markeraми) dan ushbu grafikni hosil qilamiz.



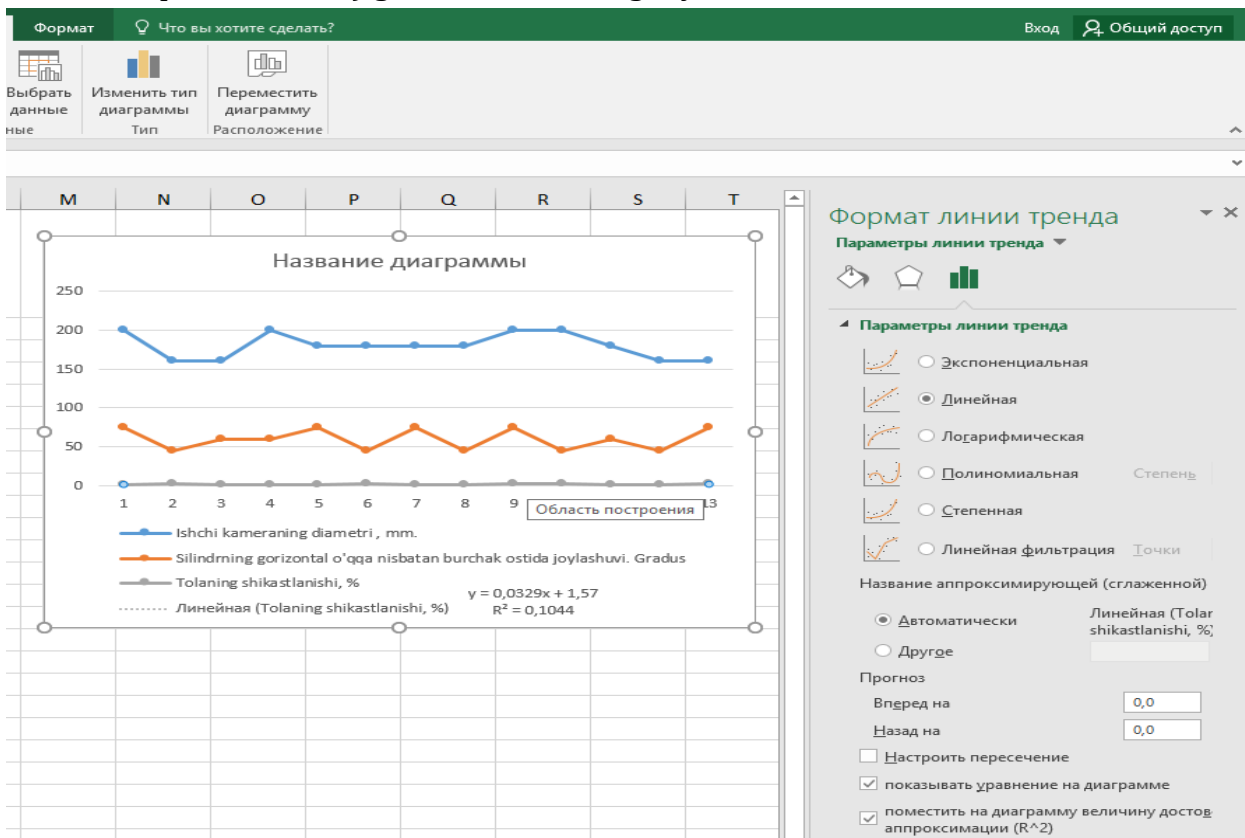
2-rasm





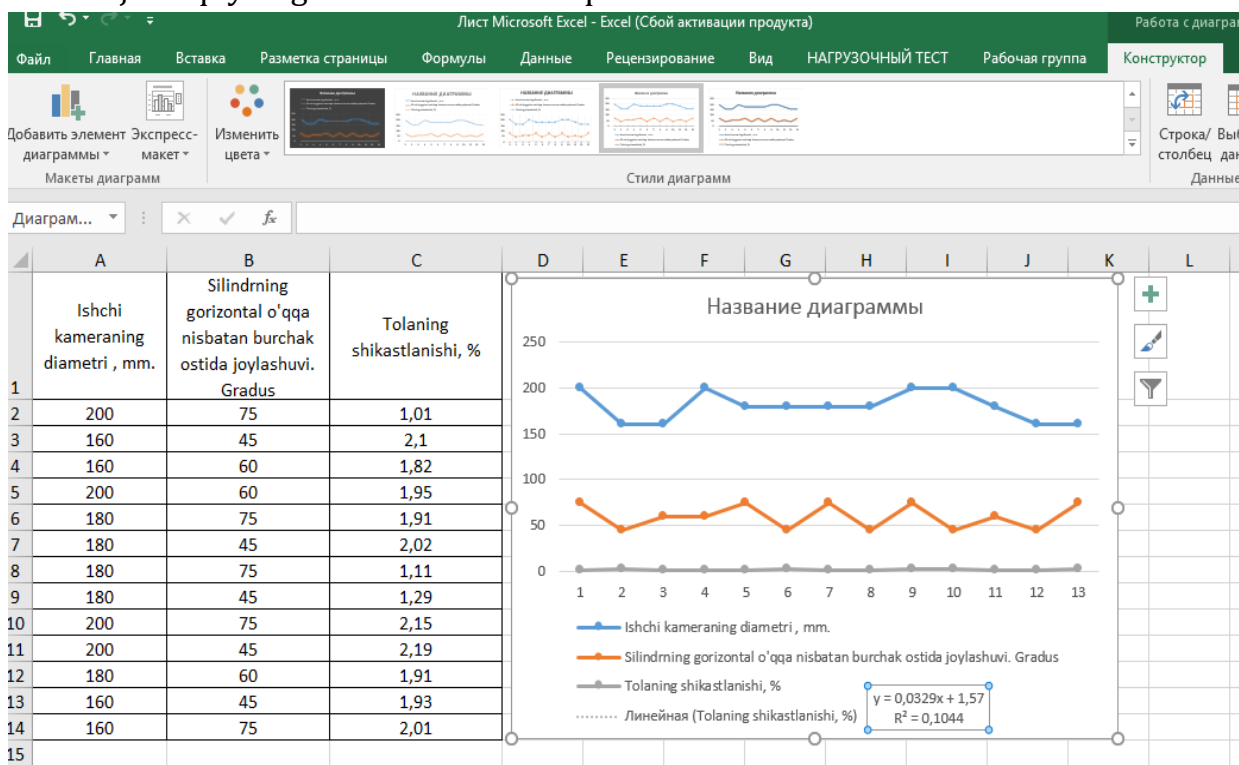
3-rasm

Sichqonchani grafik ustiga olib borib o'ng tugmasini bosamiz va undan (Добавит линию тренда) bosamiz hosil bo'lgan parametrlardan Chiziqli(линейная) dan (показывать управление на диаграмме) va (поместить на диаграмму величину достов аппроксимации) galichkalarini belgilaymiz.



4-rasm

Natijada quyidagi formula kelib chiqadi:





5-rasm

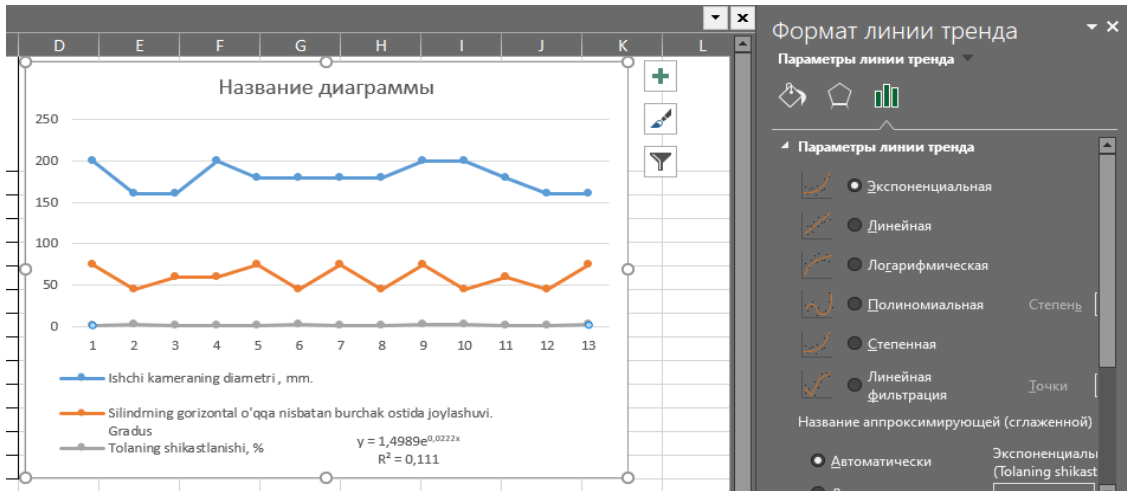
Tolaning shikastlanishi bo'yicha chiziqli regression formulasi hosil qilindi:

$$Y = 0.0329x + 1.57$$

$$R^2 = 0.1044$$

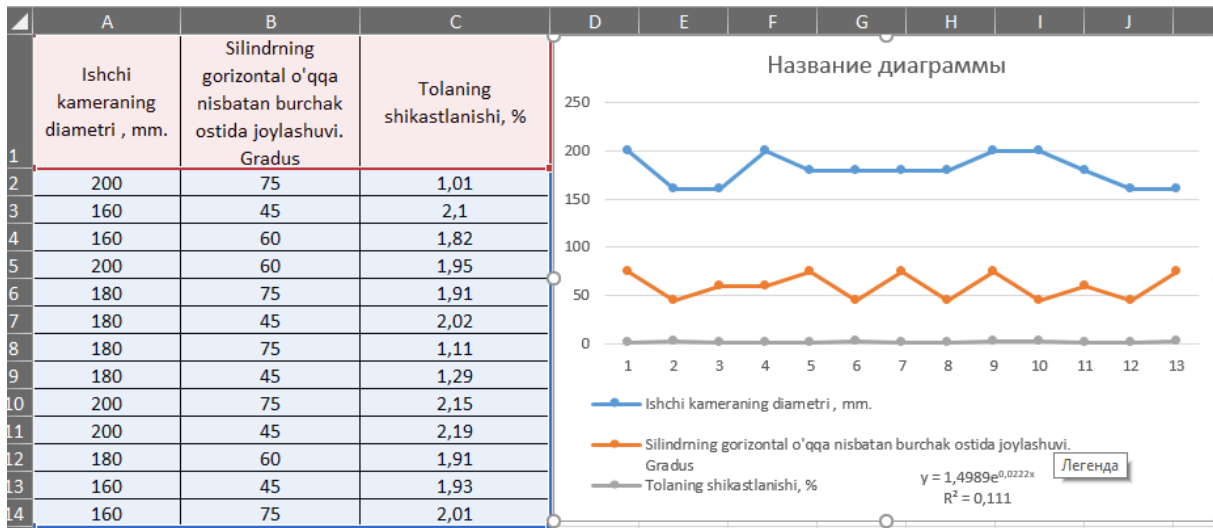
2. Ekspontensial model olish (tolaning shikastlanishi bo'yicha)

Ekspontensial model olishda (1.2.3.4-rasmlarga qarang) 4-rasm menyudagi kabi faqat bunda (экспоненциальная) parametrini bosib (показывать управление на диаграмме) va (поместить на диаграмму величину достов аппроксимации) galichkalarini belgilaymiz



6-rasm

Natijada quyidagi formula kelib chiqdi:



7-rasm

Tolaning shikastlanishi bo'yicha ekspontensial regression formulasi hosil qilindi:

$$y = 1,4989e^{0,0222x}$$

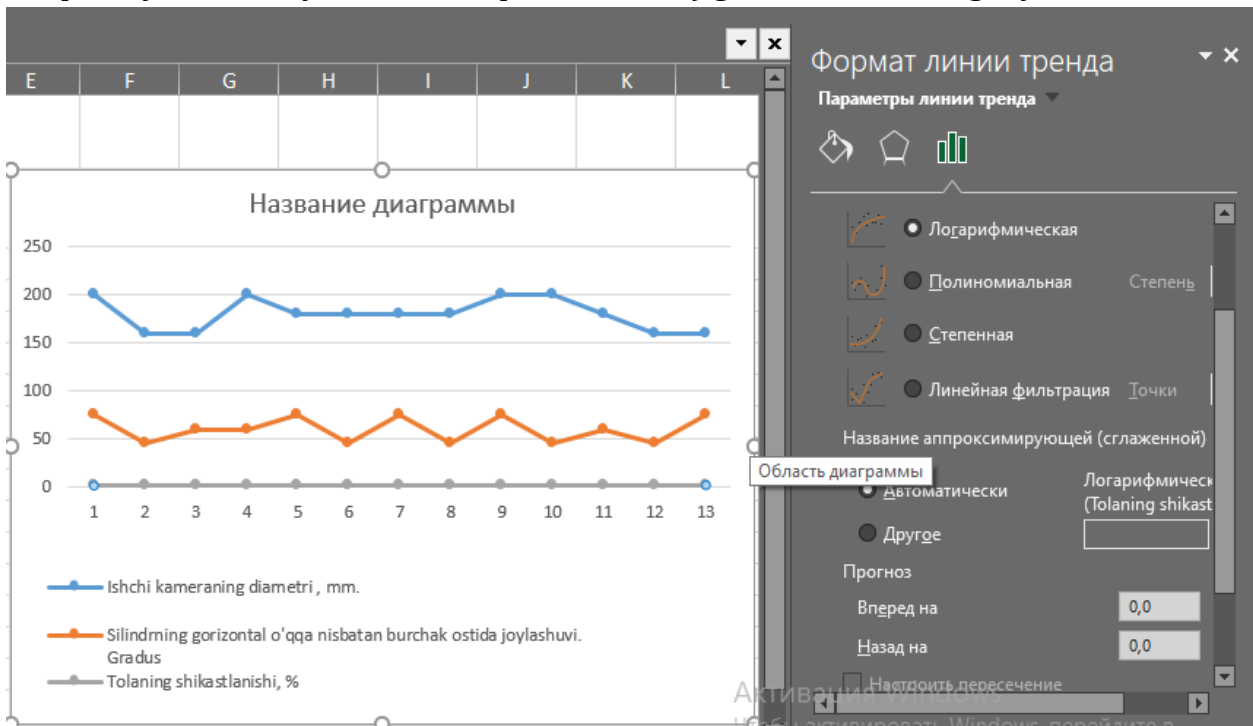
$$R^2 = 0,111$$

3. Logarifmik model olish (tolaning shikastlanishi bo'yicha)

Logarifmik model olishda ham avvalgi bajargan ketma-ketliklarimizni (1.2.3.4-rasmlarga qarang) amalga oshiramiz bunda logarifmik (логарифмическая)

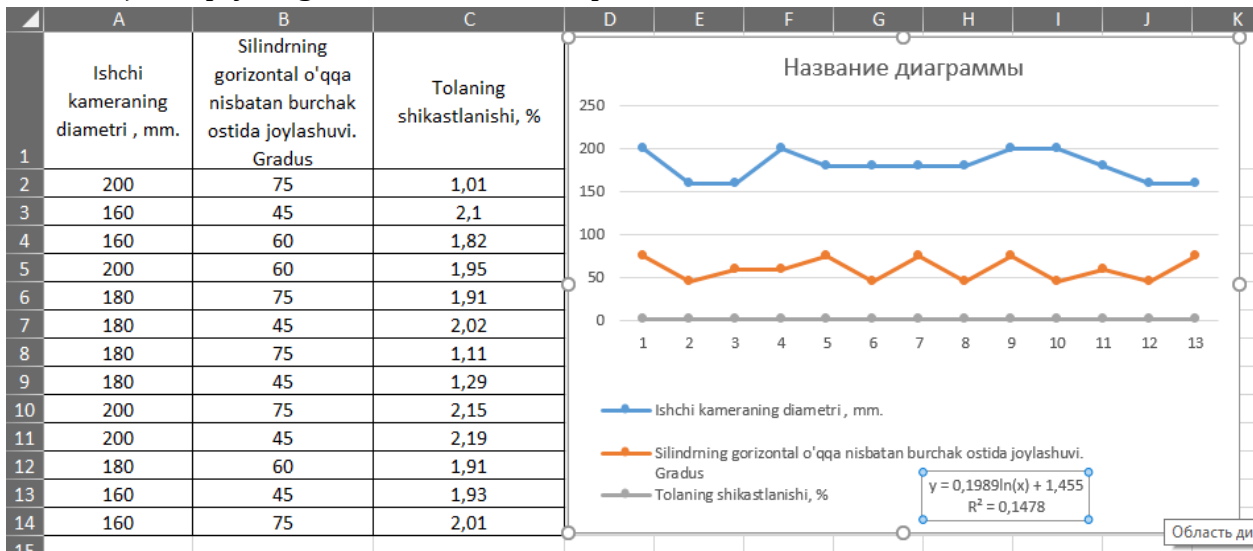


parametri bosib (показывать управление на диаграмме) va (поместить на диаграмму величину достов аппроксимации) galichkalarini belgilaymiz



8-rasm

Natijada quyidagi formula kelib chiqdi



9-rasm

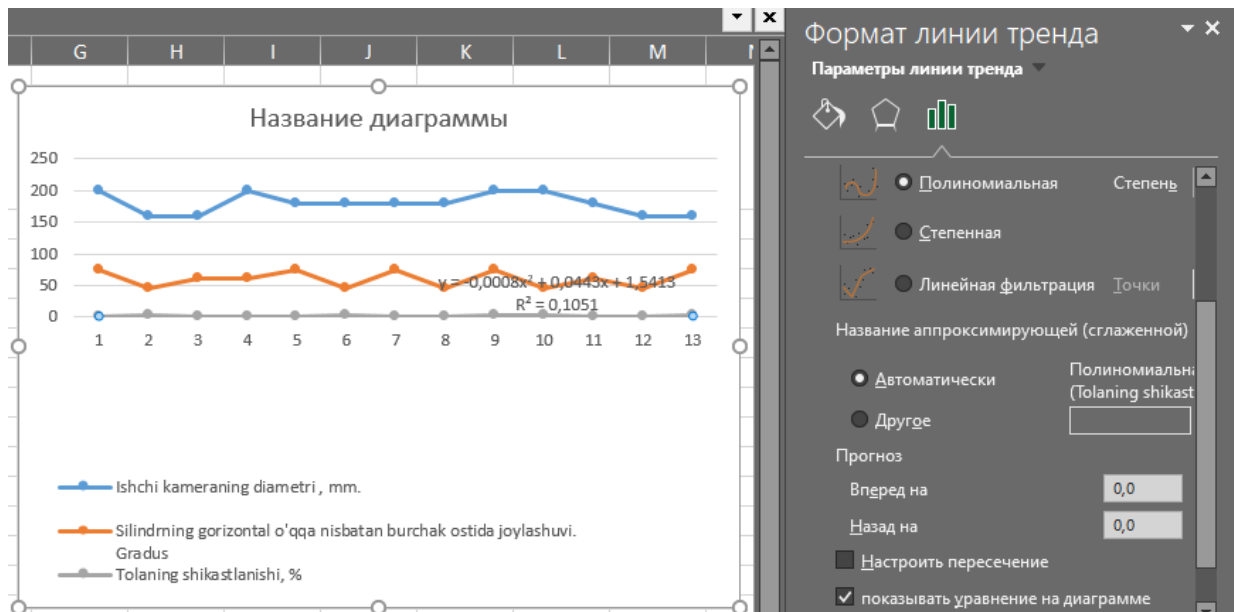
Tolaning shikastlanishi bo'yicha logarifmik tenglama hosil qilindi:

$$y = 0,1989\ln(x) + 1,455; R^2 = 0,1478$$

4. Polinomial model olish (tolaning shikastlanishi bo'yicha)

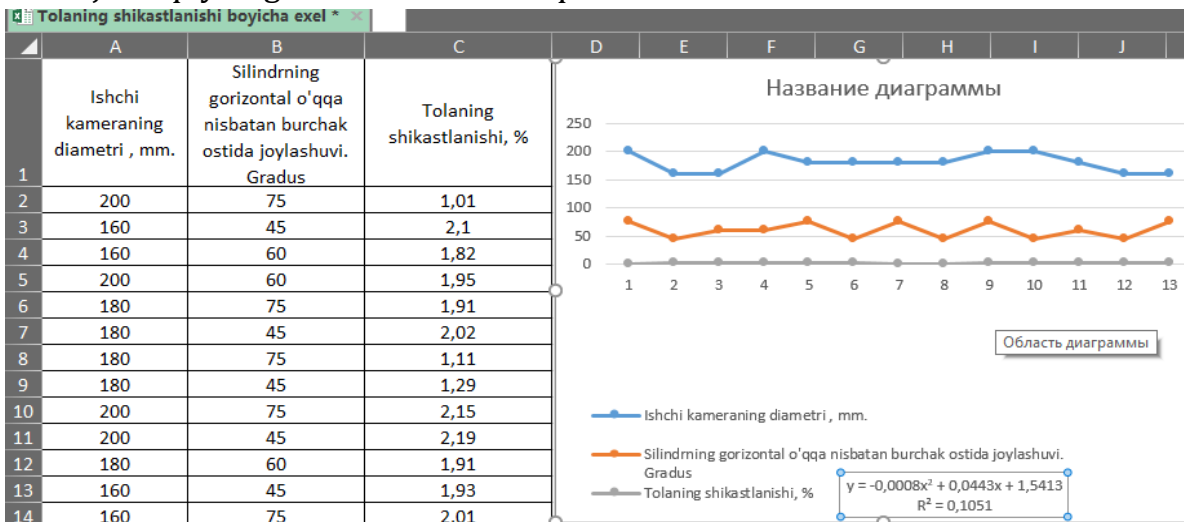
Polinomial model olishda ham avvalgi bajargan ketma-ketliklarimizni (1.2.3.4-rasmlarga qarang) amalga oshiramiz bunda polinomial (полиномальная) parametri bosib (показывать управление на диаграмме) va (поместить на диаграмму величину достов аппроксимации) galichkalarini belgilaymiz





10-rasm

Natijada quyidagi formula kelib chiqadi:



11-rasm

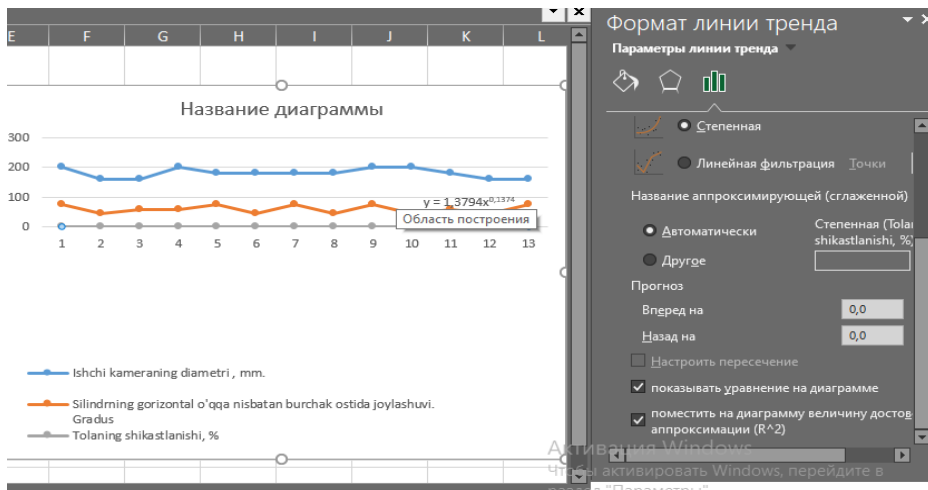
Tolaning shikastlanishi bo'yicha polinomial tenglama hosil qilindi:

$$y = -0,0008x^2 + 0,0443x + 1,5413; R^2 = 0,1051$$

5. Darajali model olish (tolaning shikastlanishi bo'yicha)

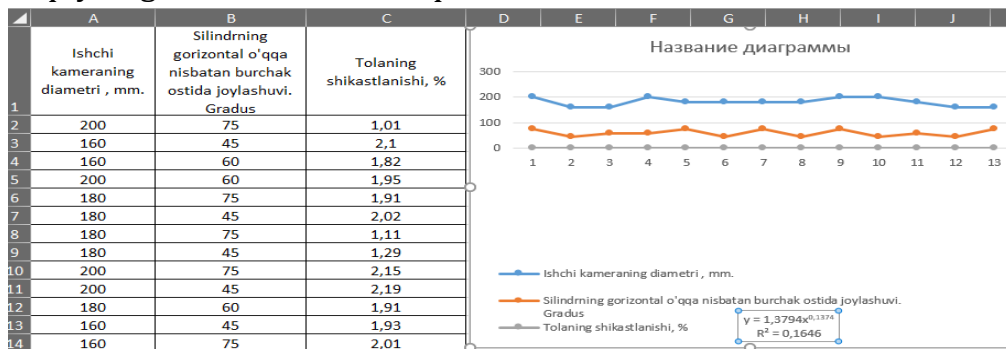
Darajali model olishda ham avvalgi bajargan ketma-ketliklarimizni (1.2.3.4-rasmlarga qarang) amalga oshiramiz bunda darajali (степенная) parametri bosib (показывать управление на диаграмме) va (поместить на диаграмму величину достов аппроксимации) galichkalarini belgilaymiz





12-rasm

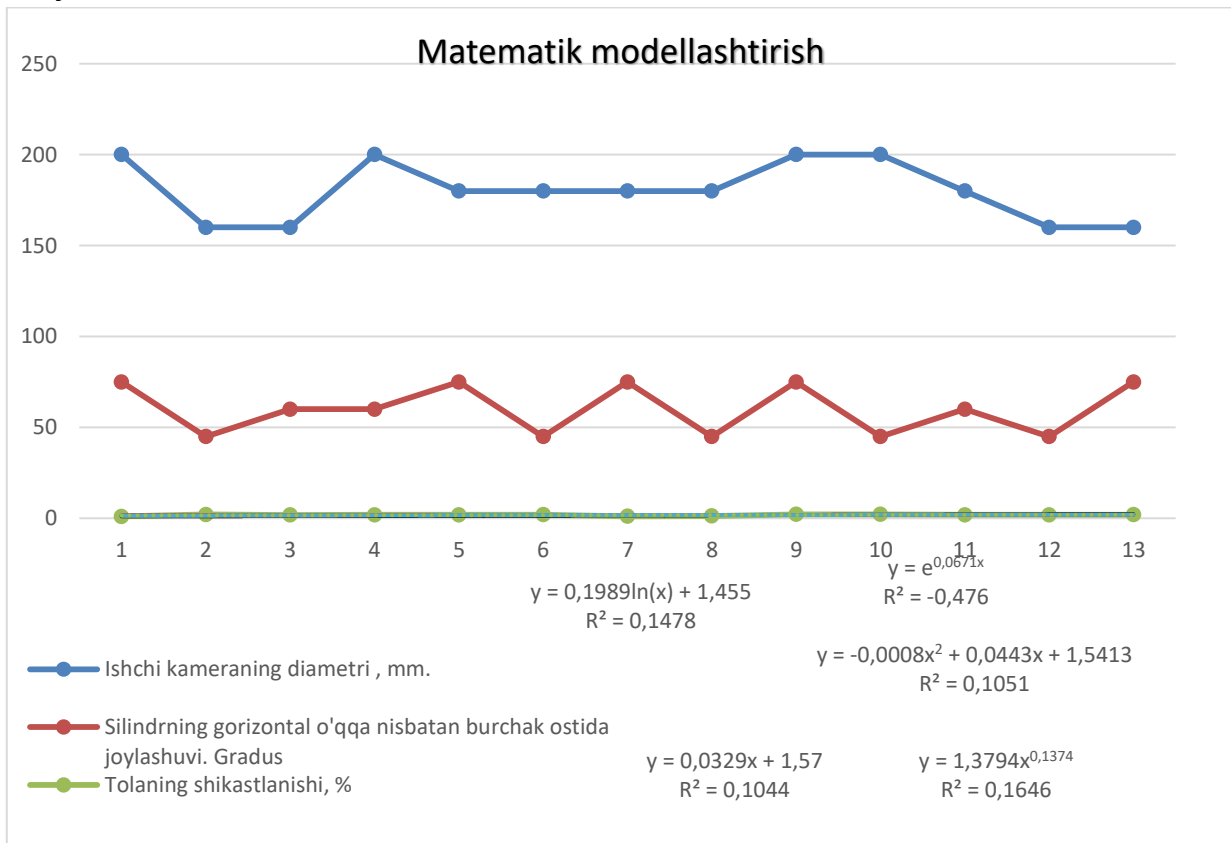
Natijada quyidagi formula kelib chiqadi:



13-rasm

Tolaning shikastlanish bo'yicha darajali formulasi hosil qilindi:

$$y = 1,3794x^{0,1374} ; \quad R^2 = 0,1646$$

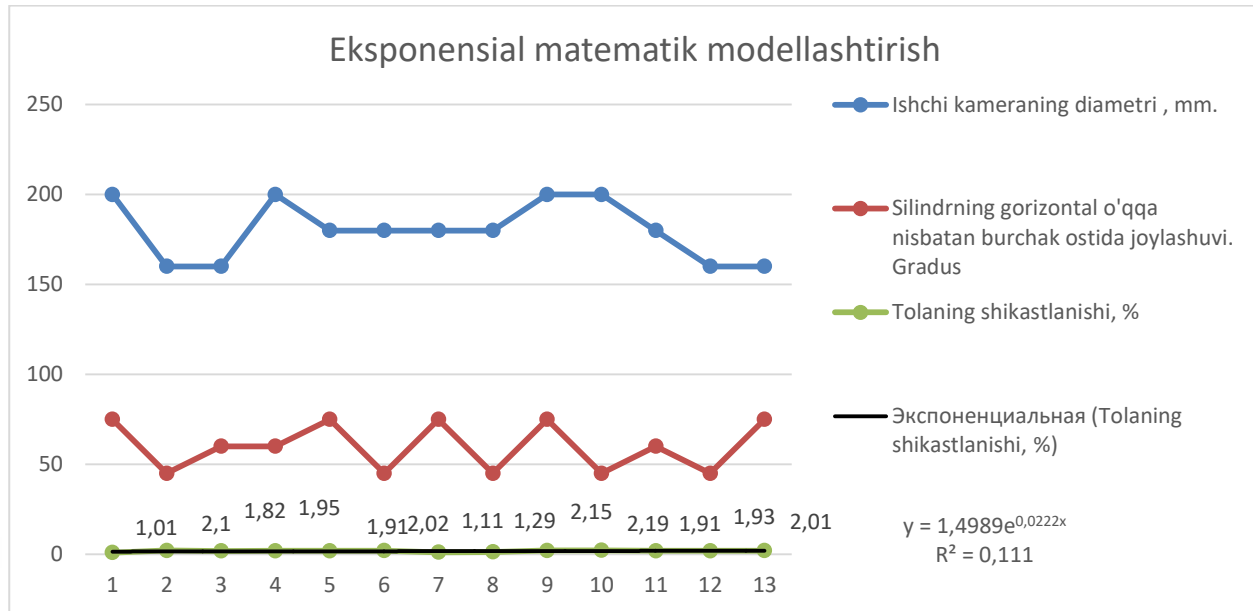




Xulosa

Matematik modellashtirishning 5 ta turini ko'rdik bir kamerali ikki silindrli jin mashinasida eng kam shikastlanish grafigi chizigiga mos keluvchi model eksponensial matematik modellashtirish bulganligi uchun ushbu modelni tanladik va uning regression formulasi oldik

$$y = 1,4989e^{0,0222x} R^2 = 0,111$$



REFERENCES

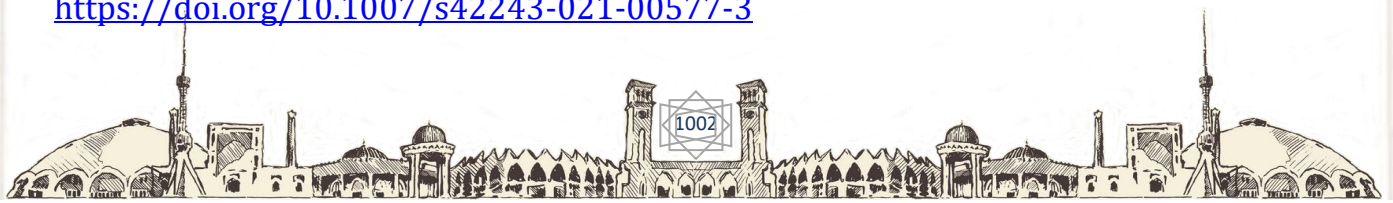
[1] Wang, G.H. and Li, Y.X. (2022) Development of New Ductile Iron with Super-High Thermal Conductivity and Elongation. *Journal of Iron and Steel Research International*, **29**, 462-473. <https://doi.org/10.1007/s42243-021-00581-7>

[2] Hassan, M. (2017) Characterization of Face Sheet/Core Debonding Strength in Sandwiched Medium Density Fiberboard. *Materials Sciences and Applications*, **8**, 673-684. <https://doi.org/10.4236/msa.2017.89048>

[3] Ning, B., Wu, H.B., Niu, G., et al. (2022) Cold Compression Deformation Method for reducing Residual Stress and Uniformizing Micro-Property in Ferrite Steel. *Journal of Iron and Steel Research International*, **29**, 503-511. <https://doi.org/10.1007/s42243-021-00563-9>

[4] Azizov, S.M. and Axmedhodjaev, X.T. (2016) The Optimal Modeling of an Angular Position of Saw Cylinders in Single-Chamber Two Cylinders Gin. *American Journal of Mechanical and Industrial Engineering*, **1**, 103-106. <https://doi:10.11648/j.ajmie.20160103.2>

[5] Wang, Y.D., Zhang, L.F., Yang, W., et al. (2022) Effect of Nozzle Type on Fluid Flow, Solidification, and Solute Transport in Mold with Mold Electromagnetic Stirring. *Journal of Iron and Steel Research International*, **29**, 237-246. <https://doi.org/10.1007/s42243-021-00577-3>





[6] Azizov, S.M. and Axmedhodjaev, H. (2015) Theoretical Analysis of Gin Cylinder for Simulating Dual Saw Cylinder Chamber Gin for Increasing Wear Proof, Energy Efficient, Saving Resources. *World Journal of Engineering and Technology*, **3**, 91-99.

[7] Azizov, S., Ibrohimov, M., Uzoqov, F. and Mirzakarimov, M. (2021) The Modelling and Introductions of New Type Ribs of Lattice of the Two Cylinder of Gin. *E3S Web of Conferences*, **273**, Article ID: 07020. <https://doi.org/10.1051/e3sconf/202127307020>

[8] Jiang, D.B., Zhang, L.F. and Wang, Y.D. (2022) Effect of Mold Electromagnetic Stirring on Solidification Structure and Solute Segregation in Continuous Casting Bloom. *Journal of Iron and Steel Research International*, **29**, 124-131.

<https://doi.org/10.1007/s42243-021-00702-2>

[9] Briseno, J. and Casanova-del-Angel, F. (2021) Fracture Mechanics on Aluminum Specimens. *World Journal of Mechanics*, **11**, 237-257. <https://doi.org/10.4236/wjm.2021.1112016>

[10] Mamatovich, A.S. and Abdusamat, K. (2011) Definition of Increasing the Fibre Capturing Surface of Saw Teeth of Cotton Ginning Machine through Mathematic Modelling. *World Journal of Mechanics*, **1**, 122-126. <https://doi.org/10.4236/wjm.2011.13017>

[11] Azizov, S., Uzoqov, F., Mirzakarimov, M. and Usmanov, O. (2021) Analysis of Namangan 77 Cotton in Production Line with Different Saw Gins for Short Fiber Yield. *E3S Web of Conferences*, **273**, Article ID: 07021. <https://doi.org/10.4236/wjm.2011.13017>

[12] Azizov, S.M. (2022) Calculation Energy of Efficiency New Ginning Machine. *Journal: Engineering*, **14**, 163-172. <https://doi.org/10.4236/eng.2022.144016>

[13] Mamatovich, A.S., Abdusamat, K. and Arras, P. (2013) The Mathematical Simulation of Brush Drums in a Dual Saw Cylinder Chamber Gin for the Purpose of Increasing the Quantity of Captured Cotton Fiber from Saw. *World Journal of Mechanics*, **3**, 58-61. <https://doi.org/10.4236/wjm.2013.31004>

