

**BIR KAMERALI IKKI SILINDIRLI JINLARDA TOLANI UNUMDORLIGI
BO'YICHA MATEMATIK MODELLASHTIRISH**

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

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

***Математическое моделирование КПД волокна в однокамерных
двухцилиндровых двигателях.***

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Аннотация. Математическое моделирование в программе Excel однокамерного двух цилиндрного 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.

***Mathematical modeling of fiber efficiency in single-chamber two-cylinder
engines.***

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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.*

Kirish. Respublikamizda *paxta* xomashyosini chuqur qayta ishlash asosida yuqori qo'shimcha qiymatli tayyor maxsulot ishlab choqarishni ko'paytirish, mamlakat paxta tozalash sanoati tuzilmasini takomillashtirish, texnik va texnologik qayta kurish asosida paxta masruloatlari tannarxini kamaytirish va sifat ko'rsatkichlarini yaxshilash ortali uning raqobatbardoshligini ta'minlashga aloxida e'tibor karatilmovda[1]. Ushbu vazifani bajarishda paxta xomashyosi chigitini ajratishda jin mashinasi ishchi kamerasi takomillashtirish xisobiga jinlash jarayoni samaradorligini oshirish muxim masalalardan xisoblanadi[2]. Shuningdek, arrali jin samaradorligini oshirishning asosiy yo'llari xomashyo valigining toladorligini oshirish, tozalangan chigitlarni tezlik bilan choqarib tashlash va bir tekisda uning zichligini kamaytirishdan iborat, deb xisoblaydilar[3].

Bir kamerali ikki silindrlil jin mashinasida kiruvchi omillarni o'zgartirgan holatda exelda 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 gorizontall o'qqa nisbatan qiyalik joylashuv burchagi 60 ni tashkil etdi [4].

Ushbu olingan natijalarga qarab biz 12 ta tajribaga asoslangan kiruvchi omilni hisobga olgan holda chiquvchi omillarni modellashtirish imkonini beruvchi matematik model loyihalashimiz kerak bo'ladi buning uchun biz avvalgi jadvaldan foydalanamiz [5]. Endi tolani ish unumdorligi bo'yicha quyidagi modellarni ko'rib chiqamiz.

- Chiziqli model olish (tolani ish unumdorligi bo'yicha)
- Eksponensial model olish (tolani ish unumdorligi bo'yicha)
- Logarifmik model olish (tolani ish unumdorligi bo'yicha)
- Polinomial model olish (tolani ish unumdorligi bo'yicha)
- Darajali model olish (tolani ish unumdorligi bo'yicha)

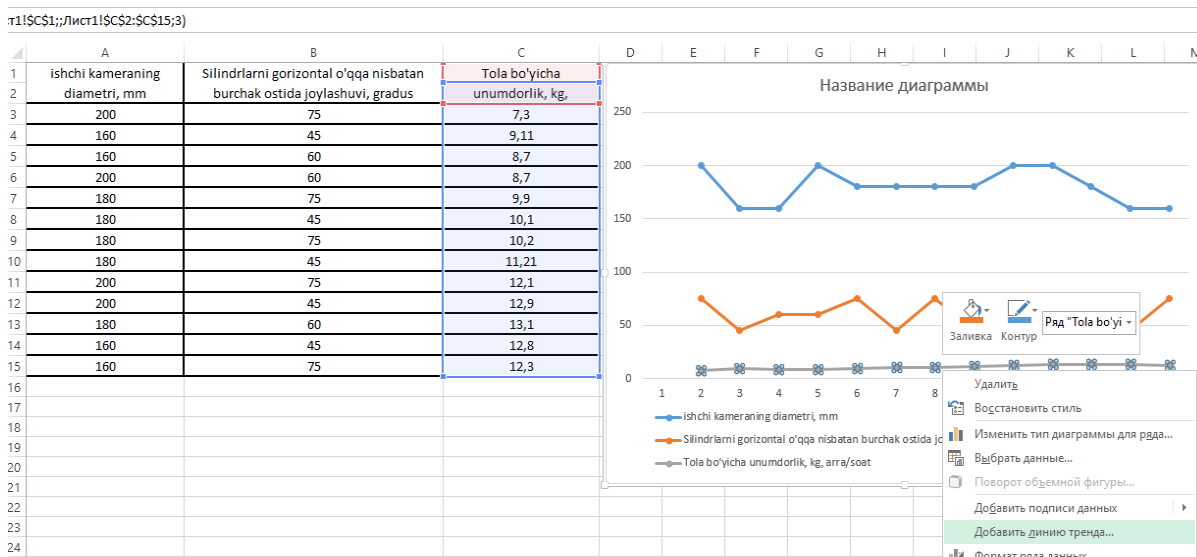
Bir kamerali ikki silindrlil jin mashinasida kiruvchi omillarni o'zgartirgan holatda Excelda qurilmani kiruvchi omillarga qarab optimal joylashish o'lchamlarini aniqlab oldik bunda ish unumdorligi ko'paytirish uchun bizda grafigimizda sinovlar natijasida eng kata ish unumdorligi 13.1 kg bo'lib, bunda optimal o'lchamlar ishchi kamerani diametric 180 mm bo'lib va arrali silindrlarni gorizontall o'qqa nisbatan qiyalik joylashuv burchagi 60 ni tashkil etdi. Ushbu olingan natijalarga qarab biz 12 ta tajribaga asoslangan kiruvchi omilni hisobga olgan holda chiquvchi omillarni modellashtirish imkonini beruvchi matematik model loyihalashimiz kerak bo'ladi[7-

8]. Bunung uchun biz avvalgi jadvaldan (1-jadval)foydalanamiz. 1-jadval

No	Mashina ish unumdorligi, t/soat	Ishchi kameraning diametri, mm	Silindrlarni gorizontal o'qqa nisbatan burchak ostida joylashuvi, gradus	Tola bo'yicha unumdorlik, kg, arra/soat
1	3	200	75	7,3
2	2	160	45	9,11
3	2	160	60	8,7
4	3	200	60	8,7
5	3	180	75	9,9
6	2	180	45	10,1
7	2	180	75	10,2
8	3	180	45	11,21
9	2,5	200	75	12,1
10	2,5	200	45	12,9
11	2,5	180	60	13,1
12	2,5	160	45	12,8
13	2,5	160	75	12,3

1. Chiziqli model olish (tolani ish unumdorligi bo'yicha)

Chiziqli model olish uchun biz Excel dasturidan foydalanamib va diogrammasi yaratiladi(rasm-1).



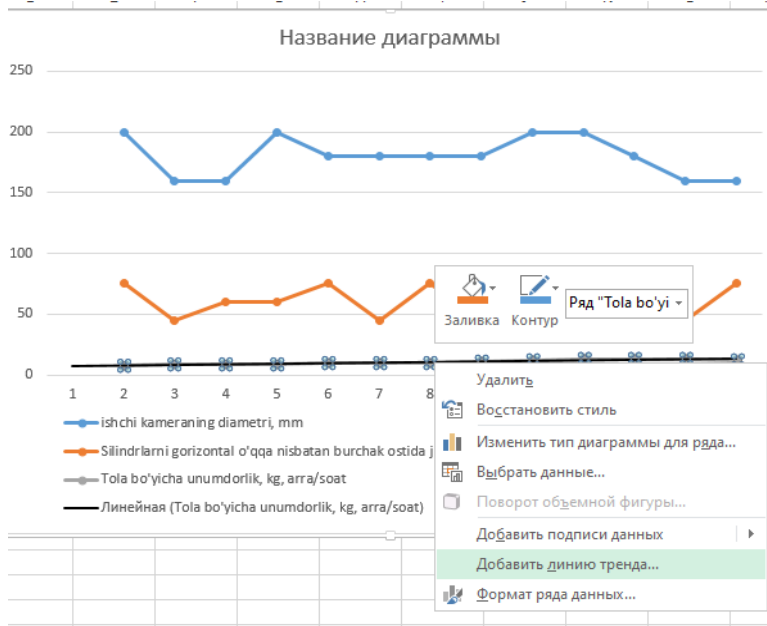
Rasm-1: Excelda diogrammasi.

Natijada tola bo'yicha unumdorlik chiziqli regression formulasi hosil qilindi va hosil bo'lgan parametrlardan chiziqli (линейная) dan (показавать управление тренда) va (поместить на диаграмму величину достов аппроксимации R^2) ni galochkalarini belgilaymiz va quyidagi formulani hosil qilamiz[6].

$$y = 0,4624x + 6,9484$$

$$R^2 = 0,9031$$

2. Eksponensial model olish (tolani ish unumdorligi bo'yicha).
 Eksponensial model olish grafigi (rasm-2).



Rasm-2:

So'ngra, Natijada tola bo'yicha unumdorlik eksponensial regression formulasi hosil qilindi va hosil bo'lgan parametrlardan eksponensial [11] dan (показывать управление тренда) va (поместить на диаграмму величину достов аппроксимации R^2) ni galochkalarini belgilaymiz (rasm-3).

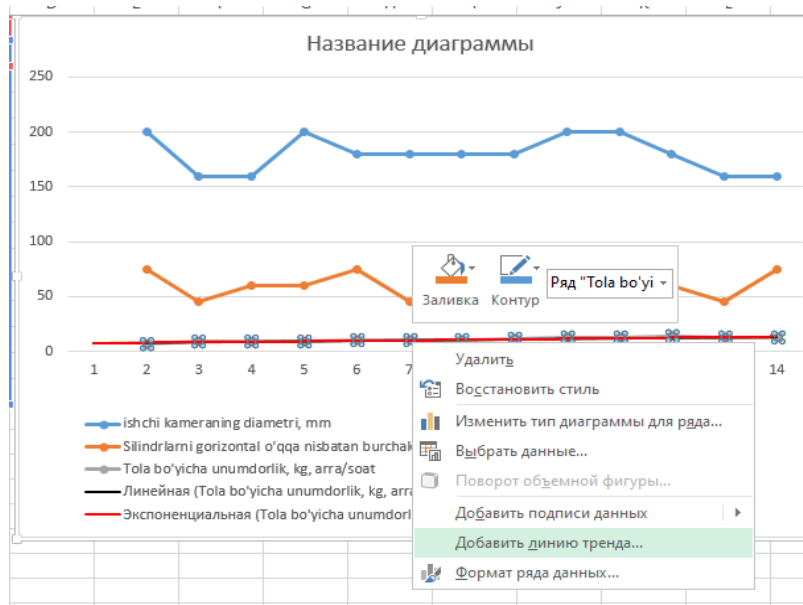


Rasm-3:

va quyidagi formulani hosil qilamiz $y = 7,3269e^{0,0448x}$; $R^2 = 0,8939$

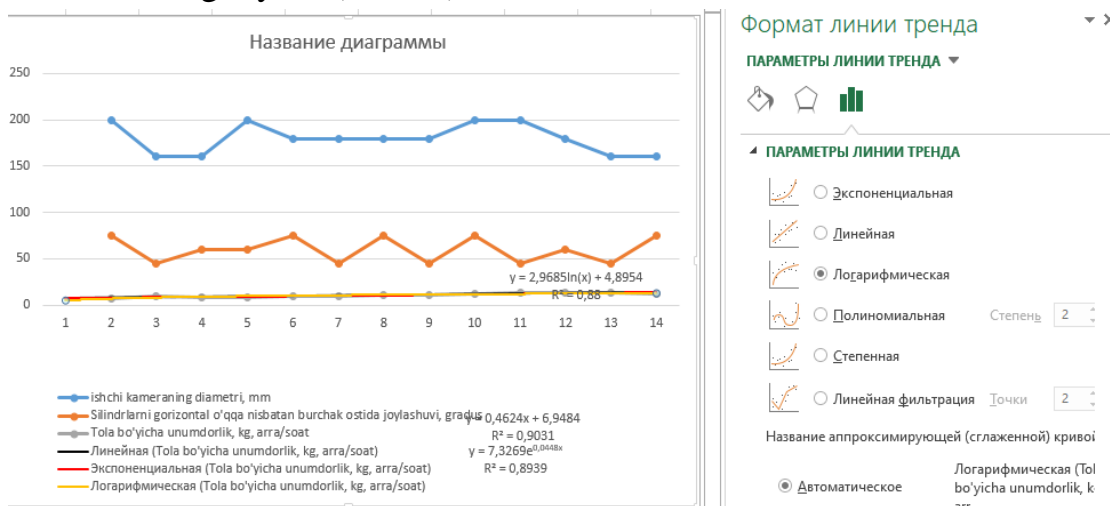
2. Logarifmik model olish (tolani ish unumdorligi bo'yicha)

Logarifmic model olish uchun sichqonchani grafik ustiga olib borib o'ng tugmasni bosamiz va sarlavhadan (добавить линию тренда) ni bosamiz(rasm-4).



Rasm-4:

So'ngra, Natijada tola bo'yicha unumdorlik logarifmik regression formulasi hosil qilindi va hosil bo'lgan parametrlardan logarifmikdan (показывать управление тренда) va (поместить на диаграмму величину достов аппроксимации R^2) ni galochkalarini belgilaymiz(rasm-5).

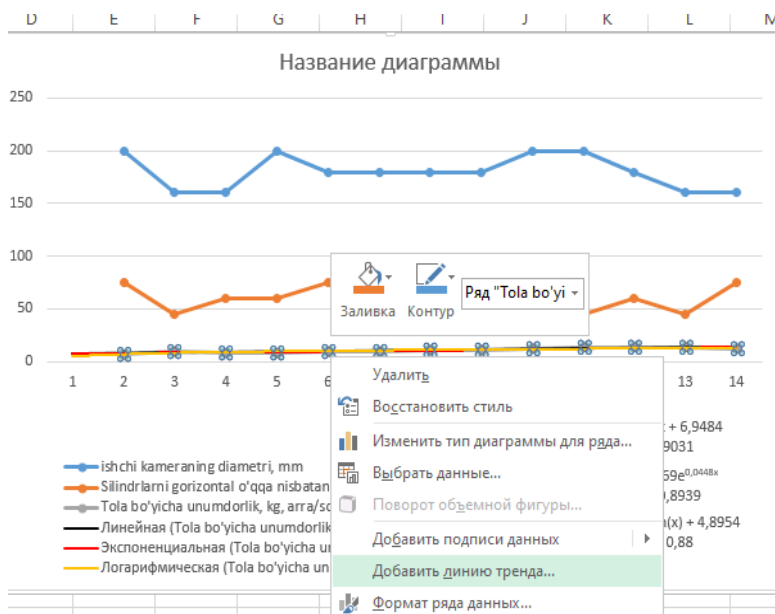


Rasm-5:

va quyidagi formulani hosil qilamiz $y = 2,9685\ln(x) + 4,8954$; $R^2 = 0,88$

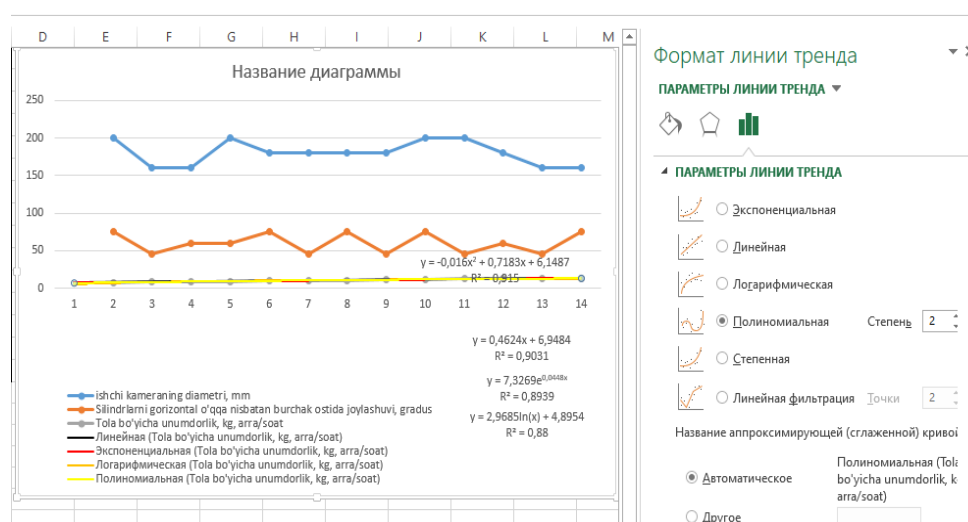
3. Polinomial model olish (tolani ish unumdorligi bo'yicha)

Polinomial model olish uchun sichqonchani grafik ustiga olib borib o'ng tugmasni bosamiz va sarlavhadan (добавить линию тренда) ni bosamiz(rasm-6).



Rasm-6:

So'ngra, Natijada tola bo'yicha unumdorlik polinomial regression formulasi hosil qilindi va hosil bo'lgan parametrlardan polinomial dan (показавать управление тренда) va (поместить на диаграмму величину достов аппроксимации R^2) ni galochkalarini belgilaymiz(rasm-7).

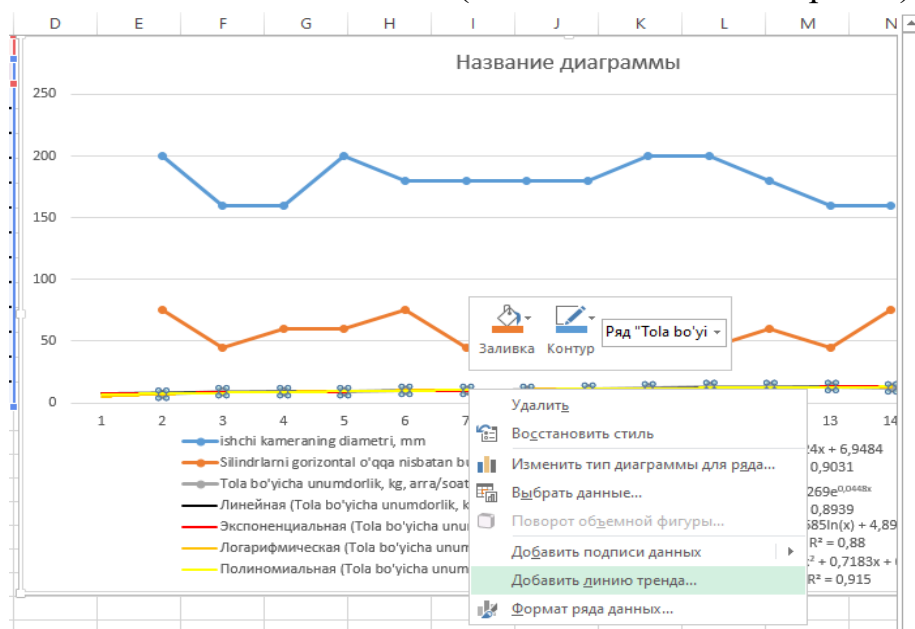


Rasm-7

va quyidagi formulani hosil qilamiz $y = -0,016x^2 + 0,7183x + 6,1487$; $R^2 = 0,915$

4.Darajali model olish (tolani ish unumdorligi bo'yicha)

Darajali model olish uchun sichqonchani grafik ustiga olib borib o'ng tugmasni bosamiz va sarlavhadan (добавить линию тренда) ni bosamiz(rasm-8).



Rasm-8:

So'ngra, Natijada tola bo'yicha unumdorlik darajali(степеная) regression formulasi hosil qilindi. $y=5,9432x^{0,293}$; $R^2 = 0,9037$;

Xulosa

Hulosa qilib shuni aytish mumkinki, matematik modellashtirishning 5 ta turining (Chiziqli, Eksponensial, Logarifmik, polinomial va darajali) grafigidan shuni ko'ramizki darajali matematik modellashtirishning grafigi bir kamerali ikki silindirli jinlarda tolani unumdorligi bo'yicha matematik modellashtirishga eng yaqin grafikligini ko'ramiz.

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