

APPLICATION OF FINITE CONTINUED FRACTIONS TO SOME EXAMPLES AND COMPARISONS

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Abstract:

This article discusses the application of finite continued fractions in solving equations of comparison. The application of continued fractions to some examples and problems is studied.

Keywords: Equation, fraction, continued fraction, equation, root extraction, comparison.

Introduction

CHEKLI ZANJIRLI KASRLARNI BAZI MISOLLARGA VA TAQQOSLAMALARGA TADBIFI

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Annotatsiya:

Ushbu maqolada taqqoslamaga doir tenglamalarni yechishda chekli zanjirli kasrlarning tadbirlari haqida keltirilgan Zanjirli kasrlarni ba'zi misol va maslalarda tadbiri o'rganilgan.

Kalit so'zlar: tenglama, kasr, zanjirli kasr, tenglama, ildizdan chiqarish, taqqoslama.

KIRISH

Zanjirli kasrlar yordamida ildizlarni taqribiy qiymatini hisoblash va undan tashqari taqqoslamali tenglamalarni ham ildizlarini mumkin.

Tadqiqot ob’ekti sifatida taqqoslama tenglamalari va ildiz osti sonlarni taqribiy hisoblashni zanjirli kasrlar yordamida yechish. Tadqiqot metodlari: masalani sonli va taqribiy hisoblash usullari.

MUHOKAMA VA NATIJALAR

[3] va [4] adabiyotlarda chekli zanjir kasrlar va ularni xossalari haqida batafsil keltirilgan. Shu teorema va xossalardan foydalanib bir nechta misollarni yechishni keltiramiz.

Matematika masalalarini yechishda ayrim qiziqarli tenglamalarga kelib qolamiz.

Ushbu $a_0 + \frac{1}{a_1 + \frac{1}{a_2 + \frac{1}{a_3 + \frac{1}{\dots + \frac{1}{a_k}}}}}$ ifodaga janjirli kasr deyiladi .

$L = a_0 + \frac{1}{a_1 + \frac{1}{a_2 + \frac{1}{a_3 + \frac{1}{\dots + \frac{1}{a_k}}}}}$ bo’lsin

$q_k = a_0 = \frac{P_0}{Q_0}$ deb olamiz. U holda buni nolinchii tartibli munosib kasr deyiladi.

$q_1 = a_0 + \frac{1}{a_1} = \frac{a_0 a_1 + 1}{a_1} = \frac{P_1}{Q_1}$ birinchi tartibli munosib kasr.

$q_2 = a_0 + \frac{1}{a_1 + \frac{1}{a_2}} = \frac{P_2}{Q_2}$ ikkinchi tartibli munosib kasr.

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$q_k = L = \frac{P_k}{Q_k}$ n-tartibli munosib kasr.

Shu yo’l bilan $P_0, P_1, P_1 \dots Q_0, Q_1, Q_2 \dots$ Ketma-ketlikni hosil qilamiz. Bu ketma-ketlikdan quydagi formulalarni hosil qilamiz $P_k = P_{k-1} a_k + P_{k-2}, Q_k = Q_{k-1} a_k + Q_{k-2}$

$\frac{P_k}{Q_k}$ k-tartibli munosib kasr deyiladi.

Yuqoridagi tushunchalardan quydagi jadvalni tuzamiz.

k	-2	-1	0	1	2	...	n-1	n
q_k	-	-	a_0	a_1	a_2	...	a_{n-1}	a_n
P_k	0	1	P_0	P_1	P_2	...	P_{n-1}	P_n
Q_k	1	0	Q_0	Q_1	Q_2	...	Q_{n-1}	Q_n

Demak berilgan kasrni chekli zanjirli kasr ko'rinishida ifodalash shu kasrga cheksiz yaqinlashadigani kasrlarni hosil qilish demak.

Misol: Berilgan $\sqrt{13}$ sonini zanjirli kasr ko'rinishida ifodalang.

$$\sqrt{13} = 3 + \frac{1}{a_1}; a_1 = \frac{1}{\sqrt{13}-3} = \frac{\sqrt{13}+3}{4} = 1 + \frac{1}{a_2};$$

$$a_2 = \frac{1}{\frac{\sqrt{13}+3}{4}-1} = \frac{4}{\sqrt{13}-1} = \frac{\sqrt{13}+1}{3} = 1 + \frac{1}{a_3};$$

$$a_3 = \frac{1}{\frac{\sqrt{13}+1}{3}-1} = \frac{3}{\sqrt{13}-2} = \frac{\sqrt{13}+2}{3} = 1 + \frac{1}{a_4};$$

$$a_4 = \frac{1}{\frac{\sqrt{13}+2}{3}-1} = \frac{3}{\sqrt{13}-1} = \frac{\sqrt{13}+1}{4} = 1 + \frac{1}{a_5};$$

$$a_5 = \frac{1}{\frac{\sqrt{13}+1}{4}-1} = \frac{4}{\sqrt{13}-3} = \sqrt{13} + 3 = 6 + \frac{1}{a_6};$$

$$a_6 = \frac{1}{\sqrt{13}+3-6} = \frac{1}{\sqrt{13}-3};$$

$a_1 = a_6$ bo'lgani uchun, yana yuqoridagi jarayon takrorlanadi. Demak $\sqrt{13} = [3; (1, 1, 1, 1, 6)]$ taqribiy qiymatni topamiz.

Misol: Berilgan taqqoslamani zanjirli kasr yordamida yeching $15x \equiv 37 \pmod{98}$.

Yechish: Bu yerda $a=15$, $b=37$ va $m=98$ bo'lib $\frac{m}{a} = \frac{98}{15}$ ni zanjirli kasrga keltirib olamiz.

$$\frac{98}{15} = [6; 1, 1, 7] \text{ va bundan jadvalga o'tamiz}$$

k	-1	0	1	2	3
q_k	-	6	1	1	7
P_k	1	6	7	13	98
Q_k	0	1	1	2	15

Endi $x = b \cdot (-1)^{n-1} \cdot p_{n-1} \pmod{m}$ formulaga qo'ysak $x = 37 \cdot (-1)^{3-1} \cdot 13 \pmod{98}$,

$$x = 37 \cdot 13 \pmod{98} \Rightarrow x = 89 \pmod{98}$$

XULOSA

Xulosa qilib shuni aytish mumkinki matematik misollarda, ya'ni taqqoslamalarda va ilsiz osti sonlarni taqribiy hisoblashda chekli zanjirli



kasrlardan foydalanish o'quvchi va talabalarga qulaylik va fikrlash darajasini kengaytirishga yordam beradi.

Foydalanilgan adabiyotlar:

1. Hojiyev J ,Faynleyb A.S. „Algebra va sonlar nazariyasi kursi, Toshkent, Uzbekiston 2001 y
2. D.Yunusova, A.Yunusov „, Algebra va sonlar nazariyasi “ Toshkent 2007 y
3. Sh.A.Ayupov, B.A.Omirov, A.X.Xudoyberdiyev, F.H.Haydarov „, Algebra va sonlar nazariyasi “ o'quv qo'llanma Toshkent 2019
4. Quchqarova, D. (2023). KVADRATIK FORMALARNI KANONIK (NORMAL) SHAKLGA KELITIRISH USULLARI. Interpretation and Researches, 1(1). ИЗВЛЕЧЕНО ОТ <https://interpretationandresearches.uz/index.php/iar/article/view/46>.