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FIZIKA-MATEMATIKA
FANLARI

IXTIYORIY NATURAL SONNING KVADRAT ILDIZINI TAQRIBIY HISOBLASHNING UMUMIY REKKURENT FORMULASI

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Annotatsiya: Ushbu maqolada ixtiyoriy k musbat natural sonni kvadrat ildizining taqribiy qiymatini hisoblovchi umumiy rekkurent formula isboti ko'rib o'tilgan.

Kalit so'zlar: xususiy xol, umumiy formula, k, musbat son, natural son.

GENERAL RECURRENT FORMULA FOR APPROXIMATE CALCULATOIN OF THE SQUARE ROOT OF AN ARBITRARY NATURAL NUMBER

Annotation: In this article, the proof of the general reccurent formula for calculating the approximate value of the square root of an arbitrary positive natural number k is considered.

Keyword: cpecial point, general formula, k, positive number, natural number

Teorema: Ixtiyoriy natural sonning kvadrat ildiznining taqribiy qiymatini hisoblash uchun $\sqrt{k} \approx \sqrt{k-1} + \dfrac{1}{2*\sqrt{k-1}}$ formuladan foydalanamiz. Bu yerda, k- ixtiyoriy musbat natural son.

Isboti: Ushbu teorema isbotini xususiy xollarda ya'ni, misollar yordamida aniqlash maqsadga yetishish yo'lida muhim omil bo'lib xizmat qiladi. Keling quyidagi berilgan misollarning yechimlariga e'tiborimizni qaratsak.

1-misol. 6 raqamining kvadrat ildizini taqribiy hisoblang.

Yechimi:

$$\sqrt{6} \approx \sqrt{6-1} + \frac{1}{2*\sqrt{6-1}} = \sqrt{5} + \frac{1}{2*\sqrt{5}} = \sqrt{5-1} + \frac{1}{2*\sqrt{5-1}} + \frac{1}{2*\sqrt{5-1}+2*\frac{1}{2\sqrt{5-1}}} = 2 + \frac{1}{4} + \frac{1}{4+\frac{1}{2}} = 2,25 + 0,(6) \approx 2,91$$

2-misol. 27 sonining kvadrat ildizini taqribiy hisoblang.

Yechimi:

$$\sqrt{27} \approx \sqrt{27-1} + \frac{1}{2*\sqrt{27-1}} = \sqrt{26} + \frac{1}{2*\sqrt{26}} = \sqrt{26-1} + \frac{1}{2*\sqrt{26-1}} + \frac{1}{2*\sqrt{26-1}+2*\frac{1}{2*\sqrt{26-1}}} =$$

$$= 5 + \frac{1}{10} + \frac{1}{10+\frac{1}{5}} = 5,1 + \frac{5}{51} \approx 5,19$$

3-misol. 102 sonining kvadrat ildizini taqribiy hisoblang.

Yechimi:

$$\sqrt{102} \approx \sqrt{102-1} + \frac{1}{2*\sqrt{102-1}} = \sqrt{101} + \frac{1}{2*\sqrt{101}} = \sqrt{101-1} + \frac{1}{2*\sqrt{101-1}} + \frac{1}{2*\sqrt{101-1}+2*\frac{1}{2*\sqrt{101-1}}} =$$

$$= 10 + \frac{1}{20} + \frac{1}{20+\frac{1}{10}} = 10 + 0,05 + \frac{10}{201} \approx 10,099$$

4-misol. 1939 sonining kvadrat ildizini taqribiy hisoblang.

Yechimi:

$$\sqrt{1939} \approx \sqrt{1939-1} + \frac{1}{2*\sqrt{1939-1}} = \sqrt{1938} + \frac{1}{2*\sqrt{1938}} = \sqrt{1938-1} + \frac{1}{2*\sqrt{1938-1}} + \frac{1}{2*\sqrt{1938-1}+2*\frac{1}{2*\sqrt{1938-1}}} =$$

$$= \sqrt{1937} + \frac{1}{2*\sqrt{1937}} + \frac{1}{2*\sqrt{1937}+\frac{1}{\sqrt{1937}}} = \sqrt{1937-1} + \frac{1}{2*\sqrt{1937-1}} + \frac{1}{2*\sqrt{1937-1}+2*\frac{1}{2*\sqrt{1937-1}}} +$$

$$+ \frac{1}{2*\sqrt{1937-1}+2*\frac{1}{2*\sqrt{1937-1}}+\frac{1}{\sqrt{1937-1}+\frac{1}{2*\sqrt{1937-1}}}} = 44 + \frac{1}{88} + \frac{1}{88+\frac{1}{44}} + \frac{1}{88+\frac{1}{44}+\frac{1}{44+\frac{1}{88}}} =$$

$$= 44 + \frac{1}{88} + \frac{44}{3873} + \frac{1}{\frac{3873}{44}+\frac{88}{3873}} = 44 + \frac{1}{88} + \frac{44}{3873} + \frac{170412}{15004001} \approx 44,0113622$$

5-misol. 10203 sonining kvadrat ildizini taqribiy hisoblang.

Yechimi:

$$\sqrt{10203} \approx \sqrt{10203-1} + \frac{1}{2*\sqrt{10203-1}} = \sqrt{10202} + \frac{1}{2*\sqrt{10202}} =$$

$$= \sqrt{10202-1} + \frac{1}{2*\sqrt{10202-1}} + \frac{1}{2*\sqrt{10202-1}+2*\frac{1}{2*\sqrt{10202-1}}} =$$

$$= \sqrt{10201} + \frac{1}{2*\sqrt{10201}} + \frac{1}{2*\sqrt{10201}+\frac{1}{\sqrt{10201}}} =$$

$$= 101 + \frac{1}{202} + \frac{1}{202+\frac{1}{101}} = 101 + \frac{1}{202} + \frac{101}{20403} \approx 101,009901$$

Keltirilgan masalalardan ko'rinib turibdiki, har qanday musbat natural sonning

kvadrat ildiznining taqribiy qiymatini hisoblashda $\sqrt{k} \approx \sqrt{k-1} + \frac{1}{2*\sqrt{k-1}}$ rekkurent

formuladan foydalansak maqsadga muvofiq bo'ladi.

Teorema isbotlandi.

Yuqorida olingan natijalardan quyidagicha umumiy xulosaga kelishimiz

mumkin: $\sqrt{k} \approx \sqrt{k-1} + \frac{1}{2*\sqrt{k-1}}$ formuladan musbat natural sonning kvadrat ildizning

taqribiy qiymatini hisoblash uchun foydalansak bo'ladi.

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