Листинг окончательного варианта программы и тесты к ней.

---<k3.c>---

//program for CP3

#include <stdio.h>

#include <math.h>

double f(double x)

{

    return x/(9+x\*x);

}

double taylor(double x, double a, double b, int &n, double eps)

{

    double di = (b-a)/n;

    int endN = n;

    double sum = x/9;

    double newEl;

    for(int i = 1; i <= n; i++)

    {

        newEl = (pow(-1, i)\*pow(x, 2\*i+1)/pow(9, i+1));

        if(newEl <= eps)

        {

            endN = i-1;

            break;

        }

        sum += newEl;

    }

    n = endN;

    return sum;

}

int main()

{

    double prev\_eps = 1;

    double eps;

    double k;

    double a = -1, b = 1;

    int n = 30;

    printf("Input k (1e12 is good) ");

    scanf("%lf", &k);

    printf("\n");

    while ((1+prev\_eps) != 1)

    {

        eps = prev\_eps;

        prev\_eps /= 2;

    }

    eps \*= k;

    printf("eps\*k is %f\n", eps);

    printf("     Table of values function f(x) = x/(9+x^2)\n");

    printf("| x            | Taylor's row sum for f(x)| f(x)        | iteration's quantity|\n");

    double dx = (b-a)/n;

    for(double x = a; x <= b; x += dx)

    {

        int n\_iter = 7;

        double taylorX = taylor(x, a, b, n\_iter, eps);

        double fX = f(x);

        if(x<0)

        {

            printf("|%f     |%f                 |%f    |%d                    |\n", x, taylorX, fX, n\_iter);

        }

        else

        {

            printf("|%f      |%f                  |%f     |%d                    |\n", x, taylorX, fX, n\_iter);

        }

    }

    return 0;

}

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Тесты:

Input k (1e14 is good) 1e14

eps\*k is 0.000011

Table of values function f(x) = x/(9+x^2)

| x | Taylor's row sum for f(x)| f(x) | iteration's quantity|

|-1.000000 |-0.100002 |-0.100000 |4 |

|-0.933333 |-0.094544 |-0.094552 |3 |

|-0.866667 |-0.088874 |-0.088879 |3 |

|-0.800000 |-0.082985 |-0.082988 |3 |

|-0.733333 |-0.076886 |-0.076887 |3 |

|-0.666667 |-0.070597 |-0.070588 |2 |

|-0.600000 |-0.064107 |-0.064103 |2 |

|-0.533333 |-0.057446 |-0.057444 |2 |

|-0.466667 |-0.050628 |-0.050627 |2 |

|-0.400000 |-0.043668 |-0.043668 |2 |

|-0.333333 |-0.036580 |-0.036585 |1 |

|-0.266667 |-0.029396 |-0.029397 |1 |

|-0.200000 |-0.022123 |-0.022124 |1 |

|-0.133333 |-0.014786 |-0.014786 |1 |

|-0.066667 |-0.007407 |-0.007404 |0 |

|-0.000000 |-0.000000 |-0.000000 |0 |

|0.066667 |0.007407 |0.007404 |0 |

|0.133333 |0.014786 |0.014786 |1 |

|0.200000 |0.022123 |0.022124 |1 |

|0.266667 |0.029396 |0.029397 |1 |

|0.333333 |0.036580 |0.036585 |1 |

|0.400000 |0.043668 |0.043668 |2 |

|0.466667 |0.050628 |0.050627 |2 |

|0.533333 |0.057446 |0.057444 |2 |

|0.600000 |0.064107 |0.064103 |2 |

|0.666667 |0.070597 |0.070588 |2 |

|0.733333 |0.076886 |0.076887 |3 |

|0.800000 |0.082985 |0.082988 |3 |

|0.866667 |0.088874 |0.088879 |3 |

|0.933333 |0.094544 |0.094552 |3 |

|1.000000 |0.100002 |0.100000 |4 |

Input k (1e14 is good) 1e9

eps\*k is 0.000000

Table of values function f(x) = x/(9+x^2)

| x | Taylor's row sum for f(x)| f(x) | iteration's quantity|

|-1.000000 |-0.100000 |-0.100000 |9 |

|-0.933333 |-0.094552 |-0.094552 |8 |

|-0.866667 |-0.088879 |-0.088879 |8 |

|-0.800000 |-0.082988 |-0.082988 |7 |

|-0.733333 |-0.076887 |-0.076887 |7 |

|-0.666667 |-0.070588 |-0.070588 |6 |

|-0.600000 |-0.064103 |-0.064103 |6 |

|-0.533333 |-0.057444 |-0.057444 |5 |

|-0.466667 |-0.050627 |-0.050627 |5 |

|-0.400000 |-0.043668 |-0.043668 |4 |

|-0.333333 |-0.036585 |-0.036585 |4 |

|-0.266667 |-0.029397 |-0.029397 |4 |

|-0.200000 |-0.022124 |-0.022124 |3 |

|-0.133333 |-0.014786 |-0.014786 |3 |

|-0.066667 |-0.007404 |-0.007404 |2 |

|-0.000000 |-0.000000 |-0.000000 |0 |

|0.066667 |0.007404 |0.007404 |2 |

|0.133333 |0.014786 |0.014786 |3 |

|0.200000 |0.022124 |0.022124 |3 |

|0.266667 |0.029397 |0.029397 |4 |

|0.333333 |0.036585 |0.036585 |4 |

|0.400000 |0.043668 |0.043668 |4 |

|0.466667 |0.050627 |0.050627 |5 |

|0.533333 |0.057444 |0.057444 |5 |

|0.600000 |0.064103 |0.064103 |6 |

|0.666667 |0.070588 |0.070588 |6 |

|0.733333 |0.076887 |0.076887 |7 |

|0.800000 |0.082988 |0.082988 |7 |

|0.866667 |0.088879 |0.088879 |8 |

|0.933333 |0.094552 |0.094552 |8 |

|1.000000 |0.100000 |0.100000 |9 |