EP 5.1.

SERII NUMERICE. NOȚIUNI GENERALE. CRITERIUL NECESAR DE CONVERGENȚĂ EXEMPLE

I. Să se găsească sumele parțiale S_n și suma S a seriei numerice:

1) $\sum_{n=0}^{\infty}\frac{2}{5^n}$;

2) $\sum_{n=0}^{\infty}\frac{(-1)^n}{3^n}$;

3) $\sum_{n=0}^{\infty}\left(\frac{1}{3^n}+\frac{1}{5^n}\right)$;

4) $\sum_{n=0}^{\infty}\frac{3^n+4^n}{8^n}$;

5) $\sum_{n=0}^{\infty}\frac{1}{(n+2)(n+3)}$;

6) $\sum_{n=0}^{\infty}\frac{1}{(3n-2)(3n+1)}$;

7) $\sum_{n=0}^{\infty}\frac{1}{n(n+1)(n+2)}$;

8) $\sum_{n=0}^{\infty}\frac{1}{(2n+1)(2n+3)(2n+5)}$;

9) $\sum_{n=0}^{\infty}\frac{1}{16n^2-8n-3}$;

10) $\sum_{n=0}^{\infty}\frac{1}{25n^2+5n-6}$;

11) $\sum_{n=0}^{\infty}\frac{1}{49n^2+7n-12}$;

12) $\sum_{n=2}^{\infty}\frac{1}{n^2-1}$;

13) $\sum_{n=1}^{\infty}\frac{1}{16n^2-8n-15}$;

14) $\sum_{n=1}^{\infty}\frac{1}{36n^2+12n-35}$;

15) $\sum_{n=1}^{\infty}\frac{3n-1}{n(n+1)(n+2)(n+3)(n+4)}$;

16) $\sum_{n=1}^{\infty}\left(n+2-2\sqrt{n+1}+\sqrt{n}\right)$;

17) $\sum_{n=2}^{\infty}\ln\left(1-\frac{1}{n^2}\right)$;

18) $\sum_{n=2}^{\infty}\ln\left(1-\frac{2}{n(n+1)}\right)$;

19) $\sum_{n=1}^{\infty}\ln\frac{n(2n+1)}{(n+1)(2n-1)}$;

20) $\sum_{n=1}^{\infty}\sin\frac{1}{2^n}\cos\frac{3}{2^n}$;

21) $\sum_{n=0}^{\infty}\frac{1}{n!(n+2)}$;

22) $\sum_{n=1}^{\infty}\operatorname{arctg}\frac{1}{2n^2}$.

II. Să se demonstreze divergența seriilor, folosind criteriul necesar de convergență:

1) $\sum_{n=1}^{\infty}\frac{7n-1}{n+5}$;

2) $\sum_{n=1}^{\infty}\sqrt{\frac{4n+4}{5n-1}}$;

3) $\sum_{n=1}^{\infty}\left(\frac{2n-1}{2n+1}\right)^n$;

4) $\sum_{n=1}^{\infty}\sqrt[n]{0,035}$,

5) $\sum_{n=1}^{\infty}\frac{n+3}{\sqrt[4]{n^4+2n^3+3n}}$;

6) $\sum_{n=1}^{\infty}(n+1)\operatorname{arctg}\frac{1}{n+2}$;

7) $\sum_{n=1}^{\infty}\frac{n^3+2}{n+2}\arcsin\frac{1}{n^2+3}$;

8) $\sum_{n=1}^{\infty}\frac{n^{n+\frac{1}{n}}}{\left(n+\frac{1}{n}\right)^n}$;

9) $\sum_{n=1}^{\infty}\left(e^{\frac{1}{n}}-1\right)\cdot n$;

10) $\sum_{n=0}^{\infty}\left(1-\cos\frac{1}{n}\right)\cdot\frac{n^2}{5}$.