ANALIZĂ MATEMATICĂ - SEMINAR 3
FACULTATEA DE MECANICĂ - an univ. **2014-2015**

1 Serii numerice

Exerciţiul 1.1 *Studiaţi convergenţa seriilor:*

I. Criteriul comparaţiei cu limită:

1. $\sum_{n=1}^{\infty} \frac{-2n+1}{n^2\sqrt[3]{n}+7}$ 2. $\sum_{n=1}^{\infty} [\ln(3^n+7^n) - n\ln 7]$

3. $\sum_{n=1}^{\infty} \frac{1}{n^2+2}$. 4. $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}+\sqrt{n+1}}$. 5. $\sum_{n=1}^{\infty} \frac{1}{n} \sin \frac{1}{\sqrt{n}}$.

6. $\sum_{n=1}^{\infty} \frac{1}{n} \ln \frac{n+1}{n}$. 7. $\sum_{n=1}^{\infty} \frac{n+3}{n^2+n+8}$. 8. $\sum_{n=1}^{\infty} \frac{1}{n\sqrt{n}+2n+1}$.

9. $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n^3+7n^2+2}}$. 10. $\sum_{n=1}^{\infty} \frac{1}{n+\sqrt{n^2+2}}$.

II. Criteriul rădăcinii:

11. $\sum_{n=1}^{\infty} \left(\frac{3n^3+4n+5}{3n^3+4n+6}\right)^{n^4}$. 12. $\sum_{n=1}^{\infty} \left(\sqrt{n^2+2n+5}-n\right)^{n^2}$.

13. $\sum_{n=1}^{\infty} \left(\frac{n+1}{3n+2}\right)^{n}$. 14. $\sum_{n=1}^{\infty} \left(\frac{4n+1}{9n+2}\right)^{\frac{n}{2}}$. 15. $\sum_{n=1}^{\infty} \left(\frac{n}{2n+1}\right)^{n^2}$.

16. $\sum_{n=1}^{\infty} \left(\frac{2n+5}{2n+6}\right)^{n^2}$. 17. $\sum_{n=1}^{\infty} \left(\frac{n^2+2n+5}{n^2+2n+7}\right)^{n^3}$. 18. $\sum_{n=1}^{\infty} \left(\sqrt[3]{n^3+4n^2+5}-n\right)^{n}$.

III. Criteriul raportului:

17. $\sum_{n=1}^{\infty} \left[\frac{n!\cdot 2^n}{1\cdot 4\cdot 7\cdot \ldots \cdot (3n-2)}\right]^2$.

18. $\sum_{n=1}^{\infty} \frac{2\cdot 5\cdot \ldots \cdot (3n-1)}{1\cdot 5\cdot \ldots \cdot (4n-3)}$. 19. $\sum_{n=1}^{\infty} \frac{1\cdot 3\cdot 5\cdot \ldots \cdot (2n-1)}{2\cdot 5\cdot 8\cdot \ldots \cdot (3n-1)}$.

20. $\sum_{n=1}^{\infty} \frac{3\cdot 7\cdot 11\cdot \ldots \cdot (4n-1)}{2^n\cdot (n+1)!}$. 21. $\sum_{n=1}^{\infty} \frac{3^{n+1}\cdot n!}{4^n\cdot 1\cdot 3\cdot 5\cdot \ldots \cdot (2n+1)}$.

22. $\sum_{n=1}^{\infty} \frac{2\cdot 5\cdot \ldots \cdot (3n-1)}{1\cdot 5\cdot \ldots \cdot (4n-3)} \cdot \frac{1}{2n+1}$. 23. $\sum_{n=1}^{\infty} 3^n \sin \frac{1}{n}$. 24. $\sum_{n=1}^{\infty} \operatorname{tg} \frac{\pi}{4^n}$.

IV. Criteriul Raabe-Duhamel:

24. $\sum_{n=1}^{\infty} \frac{2^n\cdot n!}{1\cdot 3\cdot 5\cdot \ldots \cdot (2n-1)} \cdot \frac{1}{\sqrt{2n+1}}$.

25. $\sum_{n=1}^{\infty} \frac{1\cdot 3\cdot 5\cdot \ldots \cdot (2n-1)}{2^n\cdot n!}$. 26. $\sum_{n=1}^{\infty} \left[\frac{n!\cdot 2^n}{1\cdot 3\cdot 5\cdot \ldots \cdot (2n-1)}\right]^2$.

Exerciţiul 1.2 *Studiaţi absoluta convergenţă şi semiconvergenţa următoarelor serii:*

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

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