

Stosując wszelkie poznane metody (kryt. porównawcze, kryt. d'Alamberta, kryt. Cauchy'ego, warunek konieczny), zbadać zbieżność szeregów:

$$\sum \frac{1}{(2n+1)!}, \quad \sum \frac{5^n}{n!}, \quad \sum \frac{n!}{n^n}, \quad \sum \frac{(n!)^2}{(2n)!}, \quad 10) \sum \left(\frac{n}{2n+1}\right)^n, \quad 11) \sum \frac{1}{\ln^n(n+1)}.$$

$$1) \sum \frac{1}{\ln^n(n+1)}, \quad 2) \sum \arcsin^n \frac{1}{n}, \quad 3) \sum \left(\frac{n}{2n+1}\right)^n,$$

$$a) \sum_{n=1}^{\infty} \left(\frac{2n+1}{3n+1}\right)^n; \quad b) \sum_{n=2}^{\infty} \pi^n \left(\frac{n-1}{n}\right)^{n^2}; \quad d) \sum_{n=1}^{\infty} \frac{(n-5)^n}{\sqrt{n^n}}.$$

$$a) \sum_{n=1}^{\infty} \frac{(n+1)^{2n}}{(2n^2+1)^n}; \quad b) \sum_{n=1}^{\infty} \frac{2^n+3^n}{3^n+4^n}; \quad c) \sum_{n=1}^{\infty} \frac{3^n n^{n^2}}{(n+1)^{n^2}};$$

$$3.37. \sum_{n=0}^{\infty} \left(\frac{2n+1}{3n+1}\right)^{4n}.$$

$$3.38. \sum_{n=1}^{\infty} \frac{1}{n} \left(\frac{3}{5}\right)^n.$$

$$3.52. \sum_{n=1}^{\infty} \frac{n^{100} \cdot 99^n}{100^n}.$$

$$3.53. \sum_{n=1}^{\infty} n \sqrt{\frac{1}{n^{n+1}}}.$$

$$3.41. \sum_{n=0}^{\infty} \frac{(n+1)5^n}{2^n \cdot 3^{n+1}}.$$

$$13) \sum (2^n - n^3), \quad 14) \sum (3^n - 2^n), \quad 11) \sum \frac{1}{\ln^n(n+1)}.$$

$$a) \sum_{n=1}^{\infty} \frac{2^n}{n!} \quad b) \sum_{n=1}^{\infty} \frac{2^n}{n^2} \quad c) \sum_{n=1}^{\infty} \frac{(n!)^3}{(2n)!} \quad d) \sum_{n=1}^{\infty} \frac{n^n}{n!}$$

$$e) \sum_{n=2}^{\infty} \frac{\ln n}{\pi^n} \quad f) \sum_{n=1}^{\infty} \frac{3^n n!}{n^n} \quad g) \sum_{n=1}^{\infty} \frac{2^n+3^n}{3^n+4^n} \quad h) \sum_{n=1}^{\infty} \frac{(2n)!(3n)!}{(5n)!}$$

$$1) \sum \sqrt{\frac{n+1}{n^3+1}}, \quad 2) \sum \frac{1}{n^3-4n+4}, \quad 3) \sum \frac{1}{\sqrt{n^2+2n}}, \quad 4) \sum \frac{n^3}{3^n},$$

$$5) \sum \sqrt{\frac{n+1}{n}}, \quad 6) \sum \frac{n^2+1}{n^3}, \quad 7) \sum \frac{1}{3^n} \left(\frac{n+1}{n}\right)^{n^2}, \quad 8) \sum \left(\frac{n^2+1}{n^3+1}\right)^2,$$

$$a) \sum_{n=1}^{\infty} \frac{1}{n^2+n}; \quad b) \sum_{n=1}^{\infty} \frac{n}{n^2+4}; \quad \sum_{n=1}^{\infty} \frac{3n+2}{n^4+n+1}$$

$$a) \sum_{n=1}^{\infty} \frac{3^n}{n^3}; \quad b) \sum_{n=1}^{\infty} \frac{3^n-2^n}{5^n-4^n}; \quad c) \sum_{n=2}^{\infty} n \operatorname{tg} \frac{\pi}{2^n}; \quad d) \sum_{n=1}^{\infty} \frac{(n!)(3n)!}{[(2n)!]^2}; \quad e) \sum_{n=1}^{\infty} \frac{(2n)!}{n^{2n}};$$

$$a) \sum_{n=1}^{\infty} \frac{100^n}{n!}; \quad b) \sum_{n=1}^{\infty} n^2 \sin \frac{\pi}{2^n}; \quad c) \sum_{n=1}^{\infty} \frac{n!}{n^n};$$

$$a) \sum_{n=1}^{\infty} \frac{n}{n^3+1}; \quad b) \sum_{n=1}^{\infty} n \sin \frac{1}{n^2}; \quad c) \sum_{n=1}^{\infty} \operatorname{tg}^2 \frac{1}{\sqrt{n}}; \quad d) \sum_{n=2}^{\infty} \frac{\sqrt{n+1}}{n^2-3}; \quad e) \sum_{n=1}^{\infty} \frac{2^n+1}{3^n-1}.$$

$$3.33. \sum_{n=1}^{\infty} \frac{\sin 3^n}{3^n}.$$

$$3.34. \sum_{n=1}^{\infty} 2^n \sin \frac{\pi}{3^n}.$$

$$3.35. \sum_{n=0}^{\infty} \frac{n!}{100^n}.$$

$$3.36. \sum_{n=1}^{\infty} \frac{e^n n!}{n^n}.$$

$$3.70. \sum_{n=1}^{\infty} \frac{1}{\sqrt{n(n+1)(n+2)}}.$$

$$3.54. \sum_{n=1}^{\infty} \frac{(n-1)!(n+3)! \cdot 3^n}{(2n)!}.$$

$$3.56. \sum_{n=1}^{\infty} \left( n^2 \sin \frac{2}{n} \operatorname{tg} \frac{5}{n} \right).$$

$$3.60. \sum_{n=1}^{\infty} \left( \sin \frac{1}{\sqrt{n}} \operatorname{tg} \frac{1}{\sqrt{n}} \right).$$

$$3.61. \sum_{n=1}^{\infty} \frac{1}{n} \cos \frac{1}{n}.$$

$$3.59. \sum_{n=1}^{\infty} \left( \sin \frac{1}{n} \operatorname{tg} \frac{1}{n} \right).$$

$$3.62. \sum_{n=1}^{\infty} \frac{1}{n(\sqrt{n+1}-\sqrt{n})}.$$

$$3.63. \sum_{n=1}^{\infty} \sqrt{n} \sin^2 \frac{1}{n}.$$

$$3.64. \sum_{n=1}^{\infty} \left( \sin \frac{1}{n} \cos^2 \frac{1}{n} \right)$$

$$3.65. \sum_{n=1}^{\infty} \frac{\sin(n\sqrt{n})}{n\sqrt{n}}.$$

$$3.67. \sum_{n=1}^{\infty} \frac{\sin^2 \frac{1}{n}}{\operatorname{tg} \frac{1}{\sqrt{n}}}.$$

$$14) \sum (\sqrt{n} - \sqrt{n-1}), \quad 15) \sum \frac{1}{n} (\sqrt{n^2+n-1} - \sqrt{n^2-n-1}), \quad 16) \sum \sin \frac{1}{n}.$$

$$16) \sum \cos \frac{1}{n}. \quad 11) \sum \left( \frac{1}{n} - \frac{1}{n^2} \right), \quad 12) \sum \left( 2^n - \frac{1}{n} \right),$$

$$1) \sum \frac{1}{(2n-1) \cdot 2^{2n-1}}, \quad 2) \sum \frac{1}{(2n+1)!}, \quad 3) \sum \frac{n}{3^n}, \quad 4) \sum \frac{n}{(n+1)!},$$

$$6) \sum \sin \frac{\pi}{2n}, \quad 3) \sum \operatorname{arctg} \frac{1}{2n^2}, \quad 5) \sum (\sqrt[3]{n+1} - \sqrt[3]{n}),$$

$$g) \sum_{n=1}^{\infty} \frac{\sqrt{n}}{1+n} \quad h) \sum_{n=1}^{\infty} \frac{2^n}{16^n - 1}$$

$$e) \sum_{n=1}^{\infty} \frac{\operatorname{arc} \operatorname{tg} n}{n^2} \quad f) \sum_{n=1}^{\infty} n \sin \frac{1}{n^3} \quad g) \sum_{n=1}^{\infty} \frac{2+\sin n}{n} \quad h) \sum_{n=1}^{\infty} \sqrt[3]{n} \operatorname{tg} \frac{1}{n}$$

$$a) \sum_{n=1}^{\infty} \left( \frac{n-1}{2n+1} \right)^n \quad b) \sum_{n=1}^{\infty} \frac{3^n+4^n}{2^n+5^n} \quad c) \sum_{n=1}^{\infty} n \left( \frac{3}{5} \right)^n \quad d) \sum_{n=1}^{\infty} \frac{n^{100}}{\pi^n}$$

$$e) \sum_{n=1}^{\infty} \left( \frac{n+2}{n+3} \right)^{n^2} \quad f) \sum_{n=1}^{\infty} \left( \operatorname{arc} \cos \frac{1}{n} \right)^n \quad g) \sum_{n=1}^{\infty} \frac{\sqrt{n+1}}{n^{n+1}} \quad h) \sum_{n=2}^{\infty} \ln^n \left( 2 + \frac{1}{n} \right)$$

$$i) \sum_{n=1}^{\infty} \operatorname{tg}^{2n+1} \left( \frac{\pi}{6} + \frac{1}{n} \right) \quad j) \sum_{n=2}^{\infty} \frac{1}{\ln^n n} \quad k) \sum_{n=123}^{\infty} \frac{1}{n^n} \quad l) \sum_{n=2}^{\infty} \frac{\ln n^n}{\ln^n n}$$