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Applied Mathematics-I, BAS101

Tutorial Sheet -4

Infinite Series

(Comparison Test, Cauchy's Root Test, Ratio Test, Ln Test)

Check for convergence following positive term series:

1. $\sum_{n=2}^{\infty} \left(\frac{1}{n(\log n)^2} \right)$
2. $\frac{1}{1.2.3} + \frac{3}{2.3.4} + \frac{5}{3.4.5} + \frac{7}{4.5.6} + \dots$
3. $\frac{1}{4.6} + \frac{\sqrt{3}}{6.8} + \frac{\sqrt{5}}{8.10} + \frac{\sqrt{7}}{10.12} + \dots$
4. $\sum_{n=1}^{\infty} \left(1 + \frac{1}{\sqrt{n}} \right)^{-n^{\frac{3}{2}}}$
5. $\sum \frac{1}{\sqrt{n}} \tan \frac{1}{n}$
6. $\sum \cos \frac{1}{n}$
7. $\sum \sin \frac{1}{n^2}$
8. $\sum_{n=2}^{\infty} \left(\frac{1}{n^2 (\log n)} \right)$
9. $1 + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \dots$
10. $\frac{1}{2} + \frac{1}{2.2^2} + \frac{1}{3.2^3} + \frac{1}{4.2^4} + \dots$
11. $\left(\frac{1}{3} \right)^2 + \left(\frac{1.2}{3.5} \right)^2 + \left(\frac{1.2.3}{3.5.7} \right)^2 + \dots$
12. $\frac{x}{1} + \frac{x^2}{2} + \frac{x^3}{3} + \frac{x^4}{4} + \dots, x > 0$

$$13. \frac{x^2}{2\sqrt{1}} + \frac{x^3}{3\sqrt{2}} + \frac{x^4}{4\sqrt{3}} + \frac{x^5}{5\sqrt{4}} + \dots, x > 0$$