Math 162 - Spring 2025
Workshop 11
Apr 14 - Apr 18
11.3.Integral Test, 11.4.Comparison Test ,11.5.Alternating Series

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Problem 1. Use the Integral Test to determine whether the series is convergent or divergent.
(a) $\sum_{n=1}^{\infty} \frac{tan^{-1}(n)}{1+n^2}$. (b) $\sum_{n=2}^{\infty} \frac{1}{nln(n)}$. (c) $\sum_{n=1}^{\infty} \frac{1}{n^2+n^3}$.

Problem 2. Find the values of p for which the sereies is convergent
(a) $\sum_{n=1}^{\infty} n(1+n^2)^p$. (b) $\sum_{n=1}^{\infty} \frac{ln(n)}{n^p}$.

Problem 3. Use the Direct Comparison Test to determine whether the series converges or diverges.
(a) $\sum_{k=1}^{\infty} \frac{k \cdot sin^2(k)}{1+k^3}$, (b) $\sum_{n=1}^{\infty} \frac{n!}{n^n}$, (c) $\sum_{n=1}^{\infty} \frac{e^{\frac{1}{n}}}{n}$

Problem 4. Use the Limit Comparison Test to determine whether the series converges or diverges.
(a) $\sum_{n=1}^{\infty} \sin^2\left(\frac{1}{n^2}\right)$, (b) $\sum_{n=1}^{\infty} \frac{1}{n^{1+\frac{1}{n}}}$.

Problem 5. Test the series for convergence or divergence.
(a) $\sum_{n=1}^{\infty} \frac{(-1)^n n^2}{5^n}$, (b) $\sum_{n=1}^{\infty} (-1)^n \left(\sqrt{n+1} - \sqrt{n}\right)$, (c) $\sum_{n=1}^{\infty} \frac{n\cos(n\pi)}{2^n}$.

Problem 6. Determine whether the series is absolutely convergent, conditionally convergent, or divergent
(a) $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^{\frac{2}{3}}}$, (b) $\sum_{n=1}^{\infty} \frac{1+2\sin(n)}{n^3}$, (c) $\sum_{n=0}^{\infty} (-1)^{n+1} \frac{n^2}{n^2+1}$,