

244 Review, Day 3 (no hints)

Question VII

Can

$$2y'' + y' - y = 2e^t(5\cos(2t) - 3\sin(2t))$$

be solved using the Method of Undetermined Coefficients? If so, use that method to solve it; if not, use any other legal method to solve it.

Question VIII

Use the Ratio Test to find the radius of convergence of the following series:

(Hints on the following page.)

1. $\sum_{n \geq 1} \frac{(x+1)^n}{n}$
2. $\sum_{n=1}^9 \ln(2 + \cos(n^2 + 1)) + \sum_{n \geq 10} n(x-1)^n$
3. $\sum_{n^3 \geq 125} \frac{e^{xn}}{n}$

HINT 1. For VIII(2), consider an easier problem: what is the radius of convergence of

$$\sum_{n \geq 1} n(x-1)^n$$

In what relevant mathematical ways do this easier problem and VIII(2) differ?

HINT 2. What numbers have cube greater than or equal to 125?