MATH 316D W13

DD1 Individual Quiz

1. **Change to**, "Given the following ODE with variable coefficients what would be an appropriate guess for the solution?"

   $y'' + ty = 0$

   (a) $y(t) = \sum_{n=0}^{\infty} t^n$

   (b) $y(t) = \sum_{n=0}^{\infty} b_n t^n$

   (c) $y(t) = \sum_{n=0}^{\infty} a_n t^n$

   (d) Both **b** and **c**. $\implies$ **Correct**

   (e) None of the above.

2. **Change to**, "Using the same information in question one, determine the form of the ODE using your guessed solution."

   (a) $\sum_{n=2}^{\infty} n(n-1)a_n t^{n-2} + t\sum_{n=0}^{\infty} a_n t^n = 0$

   (b) $\sum_{n=2}^{\infty} n(n-1)t^{n-2} + t\sum_{n=0}^{\infty} t^n = 0$

   (c) $\sum_{n=2}^{\infty} n(n-1)b_n t^{n-2} + t\sum_{n=0}^{\infty} b_n t^n = 0$

   (d) Either **a** or **c**. $\implies$ **Correct**

3. **Add**, "Choose the correct form of the second derivative of your guessed solution that will allow you to simply the ODE into one summation."

   (a) $\sum_{n=2}^{\infty} n(n-1)t^{n-2}$

   (b) $\sum_{n=0}^{\infty}(n+2)(n+1)a_{n+2}\,t^n$ $\implies$ **Correct**

   (c) $\sum_{n=0}^{\infty}(n-2)(n-3)b_{n-2}\,t^{n-4}$

   (d) Either **b** or **c**.

4. **Add**, "Solve the ODE from question one, and assuming a solution that involves only the even indices, what would be the form of the coefficients?"

   (a) $\sum_{n=0}^{\infty} a_n = -\sum_{n=0}^{\infty}(n+2)(n+1)a_{n+2}$, for n $= 0, 2, 4, ...$ $\implies$ **Correct**

   (b) $\sum_{n=1}^{\infty} a_n = -\sum_{n=1}^{\infty}(n-2)(n-3)a_{n-2}$, for n $= 1, 3, 5, ...$

   (c) $\sum_{n=1}^{\infty} b_n = -\sum_{n=1}^{\infty}(n+2)(n+1)b_{n+2}$, for n $= 1, 3, 5, ...$

   (d) $\sum_{n=0}^{\infty} b_n = -\sum_{n=0}^{\infty}(n-2)(n-3)b_{n-2}$, for n $= 0, 2, 4, ...$

5. **Add**, "From your answer to the previous question determine a simplified form for the summation of your coefficient by expanding the first few iterations."

   (a) $\sum_{n=0}^{\infty} b_n = -\sum_{n=0}^{\infty} \frac{b_{n+2}}{3|n|}$, for n $= 0, 2, 4, ...$

   (b) $\sum_{n=1}^{\infty} a_n = -\sum_{n=1}^{\infty} \frac{a_{n+2}}{2n}$, for n $= 1, 3, 5, ...$

   (c) $\sum_{n=0}^{\infty} a_n = -\sum_{n=0}^{\infty} \frac{a_0}{n!}$, for n $= 0, 2, 4, ...$ $\implies$ **Correct**

   (d) None of the above.

DD2 Group Quiz

Group Quiz DD2 is an accountability quiz.