Tasks for this class

Higher order linear nonhomogeneous equations with variable coefficients

(1) [Sec 7, Q2]
\[ y'' + y = \tan(t) \]

(2) [Sec 7, Q5]
\[ xw'' - (1 + x)w' + w = x^2e^x \] [The homogeneous solutions are \( e^x \) and \( 1 + x \).]
(3) [Sec 7, Q13]
\[ \cos(x)z' + \sin(x)z = \cos^2(x) \sin(x) \] [The homogeneous solutions are 1 and \( \sin(x) \).] 
Look for a solution on \( (-\frac{\pi}{2}, \frac{\pi}{2}) \).

(4) [Sec 7, Q22]
Write down a general solution to the non-homogeneous second-order linear equation \( x'' + x = \sec(t) \), for \( t \in (-\frac{\pi}{2}, \frac{\pi}{2}) \), using the two methods discussed in this section. Which one is lengthier/easier to solve with?

Useful Information

• Exam 2. October 30. Material: Lvrnr, Ch. 2 Sections 1-5, 6.1-6.4, 7.1-7.3, 8.