Quiz 1 MTH335 Fall 2026

Sunday, September 13, 2026 9:04 AM

Find interval of existence + uniqueness for

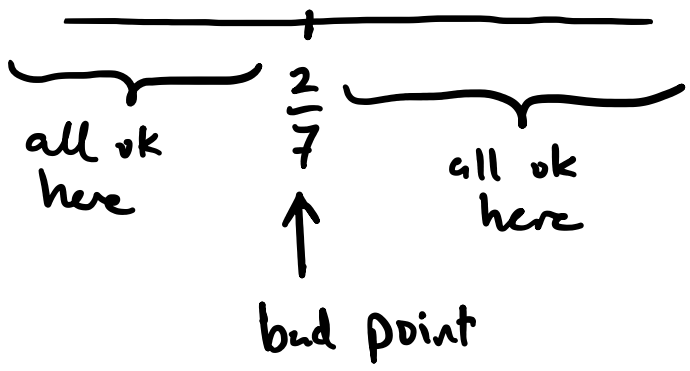
$$\begin{cases} (7t-2)y' + ty = \cos(t) \\ y(-5) = 4 \end{cases}$$

Soln: Must put into standard form $\left(y' + P(t)y = Q(t)\right)$

by dividing by $7t-2$:

$$y' + \underbrace{\frac{t}{7t-2}}_{=:P(t)} y = \underbrace{\frac{\cos(t)}{7t-2}}_{=:Q(t)}$$

We see that P and Q are continuous for all t except when $7t-2=0 \rightarrow t=\frac{2}{7}$



$\rightarrow$ we have 2 possible intervals of existence + uniqueness: $(-\infty, \frac{2}{7})$ and $(\frac{2}{7}, \infty)$

Our initial data $y(-5)=4$ places us in $\boxed{(-\infty, \frac{2}{7})}$

Which interval contains $t=-5$?