

Question 9

At one point a concentration field has $C_x = 4$, $C_y = 0$, $C_t = -1.5$ in appropriate mg/L per meter or minute units.

Tasks

1. Interpret each.
2. Explain what $C_y = 0$ does not imply.
3. Predict separate changes for .2 m in $+x$, .2 m in $+y$, and 2 minutes.

Question 9 – Solution

Strategy. Preserve held-fixed conditions and units.

Step 1: Meaning Concentration rises 4 mg/L per x meter, has zero instantaneous y slope, and falls 1.5 mg/L per minute.

Step 2: Caution $C_y = 0$ at one point does not mean independence from y nearby.

Step 3: Predictions $\Delta C_x \approx .8 \text{ mg/L}$, $\Delta C_y \approx 0$, and $\Delta C_t \approx -3.0 \text{ mg/L}$.