



# Differential Equations

## Quiz #3

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Name: \_\_\_\_\_

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**Question 1.** The set of solutions of the equation  $x^{(2)}(t) = t^3 x'(t) + \log(t) \cdot x(t) + e^t$

- is a vector space ..... ☐
- is an affine space ..... ☐
- has dimension 2 ..... ☐
- has dimension 3 ..... ☐

**Question 2.** Knowing that  $\lambda^4 - 2\lambda^2 + 1 = (\lambda - 1)^2(\lambda + 1)^2$ , give a basis of solutions of the equation:

$$x^{(4)}(t) = 2x^{(2)}(t) - x(t)$$

**Question 3.** Consider the following third order scalar equation:

$$x^{(3)}(t) = a_2(t)x^{(2)}(t) + a_1(t)x'(t) + a_0(t)x(t) + b(t)$$

Write it as a *first order vector* equation.