1. Suppose we want to solve $x'' - 4x' + 4x = t^2$ using the method of undetermined coefficients. What form should we guess for the particular solution?

(A) at^2

(B) $at + b$

(C) $at^2 + bt + c$

(D) None of the above

2. Suppose we want to solve $x'' - 4x' + 4x = t^2 e^t$ using the method of undetermined coefficients. What form should we guess for the particular solution?

(A) $at^2 e^t$

(B) $(at^2 + bt + c)e^t$

(C) $(at^3 + bt^2 + ct + d)e^t$

(D) None of the above

3. Suppose we want to solve $x'' - x' - 6x = e^{3t}$ using the method of undetermined coefficients. What form should we guess for the particular solution?

(A) ae^{3t}

(B) ate^{3t}

(C) at^2e^{3t}

(D) None of the above

4. Suppose we want to solve $x'' - 4x' + 4x = e^{2t}$ using the method of undetermined coefficients. What form should we guess for the particular solution?

(A) ae^2t

(B) ate^{2t}

(C) at^2e^{2t}

(D) None of the above

5. Suppose a 2×2 matrix A has eigenvalues 2 and 3 and we want to solve the system

$$\vec{x}' = A\vec{x} + \begin{bmatrix} e^{2t} \\ t + e^t \end{bmatrix}$$

using the method of undetermined coefficients. What form should we guess for the particular solution?

(A) $\vec{a}e^{2t} + \vec{b}e^t + \vec{c}t$

(B) $\vec{a}te^{2t} + \vec{b}e^t + \vec{c}t + \vec{d}$

(C) $\vec{a}e^{2t} + \vec{b}te^{2t} + \vec{c}e^t + \vec{d}t + \vec{e}$

(D) None of the above

Observe that the roots of $r^2 - 2r + 5$ are $1 \pm 2i$.

6. Suppose we want to solve

$$x'' - 2x' + 5x = e^t \cos(2t)$$

using the method of undetermined coefficients. What form should we guess for the particular solution?

(A) $ae^t \cos(2t)$

(B) $ae^t \cos(2t) + be^t \sin(2t)$

(C) $ate^t \cos(2t) + bte^t \sin(2t)$

(D) None of the above