A) $|X| = \begin{array}{cc} x_1 & x_2 \\ \left|\begin{matrix} t & t^2 \\ 1 & 2t \end{matrix}\right| \end{array} = 2t^2 - t^2 = t^2$

donde $w = 0$ perdemos continuidad

B) $(-\infty, 0)$ ; $(0, \infty)$ , $t \neq 0$

$\begin{bmatrix} a(t) & b(t) \\ c(t) & e(t) \end{bmatrix}$

C) $y(t) = C_1 \vec{x}^{(1)}(t) + C_2 \vec{x}^{(2)}(t) \longrightarrow$ Cualquier vector $\vec{C}$ es válido

$= \vec{C} \cdot \vec{x}(t)$

D) $\frac{d}{dt}\left(C_1 \vec{x}^{(1)}(t) + C_2 \vec{x}^{(2)}(t)\right)$

$x_1 = \begin{pmatrix} t \\ 1 \end{pmatrix}$

$x_2 = \begin{pmatrix} t^2 \\ 2t \end{pmatrix}$

$= \frac{d}{dt}\left(C_1 \begin{pmatrix} t \\ 1 \end{pmatrix}\right) + \frac{d}{dt}\left(C_2 \begin{pmatrix} t^2 \\ 2t \end{pmatrix}\right)$

$= \begin{pmatrix} C_1 \\ 0 \end{pmatrix} + \begin{pmatrix} 2C_2 t \\ 2C_2 \end{pmatrix} = C_1 \begin{pmatrix} 1 \\ 0 \end{pmatrix} + C_2 \begin{pmatrix} 2t \\ 2 \end{pmatrix}$

$P(t) \begin{pmatrix} t \\ 1 \end{pmatrix} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$ ; $P(t) \begin{pmatrix} t^2 \\ 2t \end{pmatrix} = \begin{pmatrix} 2t \\ 2 \end{pmatrix}$

$P(t) = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ ; $P(t) = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$

$at + b = 1$
$ct + d = 0$

$b = 1 - at$
$d = -ct$

$at^2 + 2bt = 2t$
$ct^2 + 2dt = 2$

$a\cancel{t}^2 + 2b\cancel{t} = 2\cancel{t}$
$at + 2b = 2$
$at + 2(1 - at) = 2$
$at - 2at + 2 = 2$
$a = 0$
$b = 1$

$ct^2 + 2dt = 2$
$ct^2 - 2ct^2 = 2$
$-ct^2 = 2$
$c = -\frac{2}{t^2}$

$P(t) = \begin{pmatrix} 0 & 1 \\ -\frac{2}{t^2} & \frac{2}{t} \end{pmatrix}$ , $x_1 = \begin{pmatrix} t \\ 1 \end{pmatrix}$ , $x_2 = \begin{pmatrix} t^2 \\ 2t \end{pmatrix}$

$\dot{\vec{x}}_i = P(t)\, x_i$