Unit Step Response: Post-initial Conditions

Quiz: Consider the equation

$$\dot{v} + kv = u(t)$$

with rest initial conditions, $v(0^-) = 0$.

For the solution $v(t)$ what is $\dot{v}(0^+)$?

Choices:

a) $\dot{v}(0^+) = 0$

b) $\dot{v}(0^+) = 1/k$

c) $\dot{v}(0^+) = 1$

d) $\dot{v}(0^+) = k$

e) None of these.

Answer: (c)
$v(t)$ is continuous so $v(0^-) = v(0^+) = v(0) = 0$ Therefore the DE shows $\dot{v}(0^+) = u(0^+) = 1$.

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