

**13.16** Given the following functions  $F(s)$ , find  $f(t)$

$$(a) F(s) = \frac{10}{s^2 + 2s + 2}$$

$$(b) F(s) = \frac{10(s + 2)}{s^2 + 4s + 5}$$

SOLUTION:

$$a) F(s) = \frac{10}{(s+1-j1)(s+1+j1)} = \frac{-5j}{s+1-j1} + \frac{5j}{s+1+j1}$$

$$K_1 = -j5 = 5 \angle -90^\circ$$

$$f(t) = 10 e^{-t} \cos(t - 90^\circ) u(t)$$

$$b) F(s) = \frac{10(s+2)}{(s+2-j1)(s+2+j1)} = \frac{K_1}{s+2-j1} + \frac{K_1^*}{s+2+j1}$$

$$K_1 = \frac{10(-2+j1+2)}{j2} = 5 \Rightarrow K_1^* = 5$$

$$F(s) = \frac{5}{s+2-j1} + \frac{5}{s+2+j1}$$

$$f(t) = 10 e^{-2t} \cos(t) u(t)$$