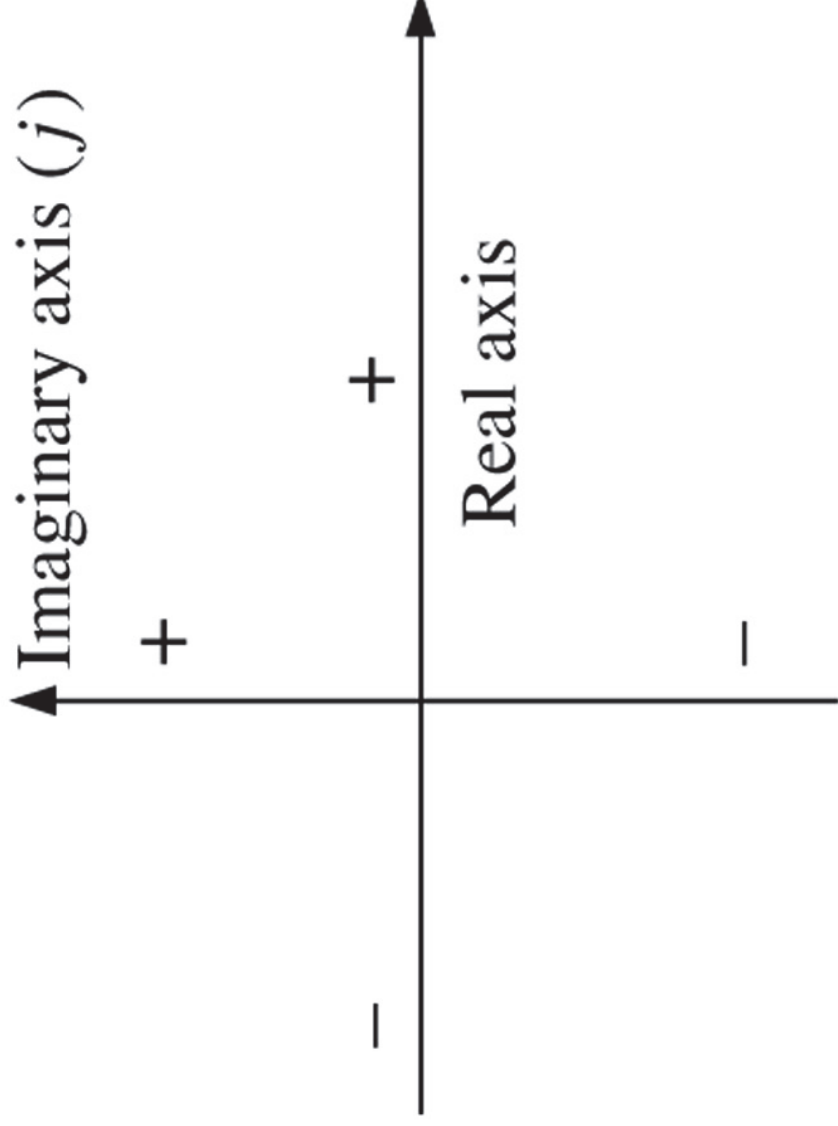


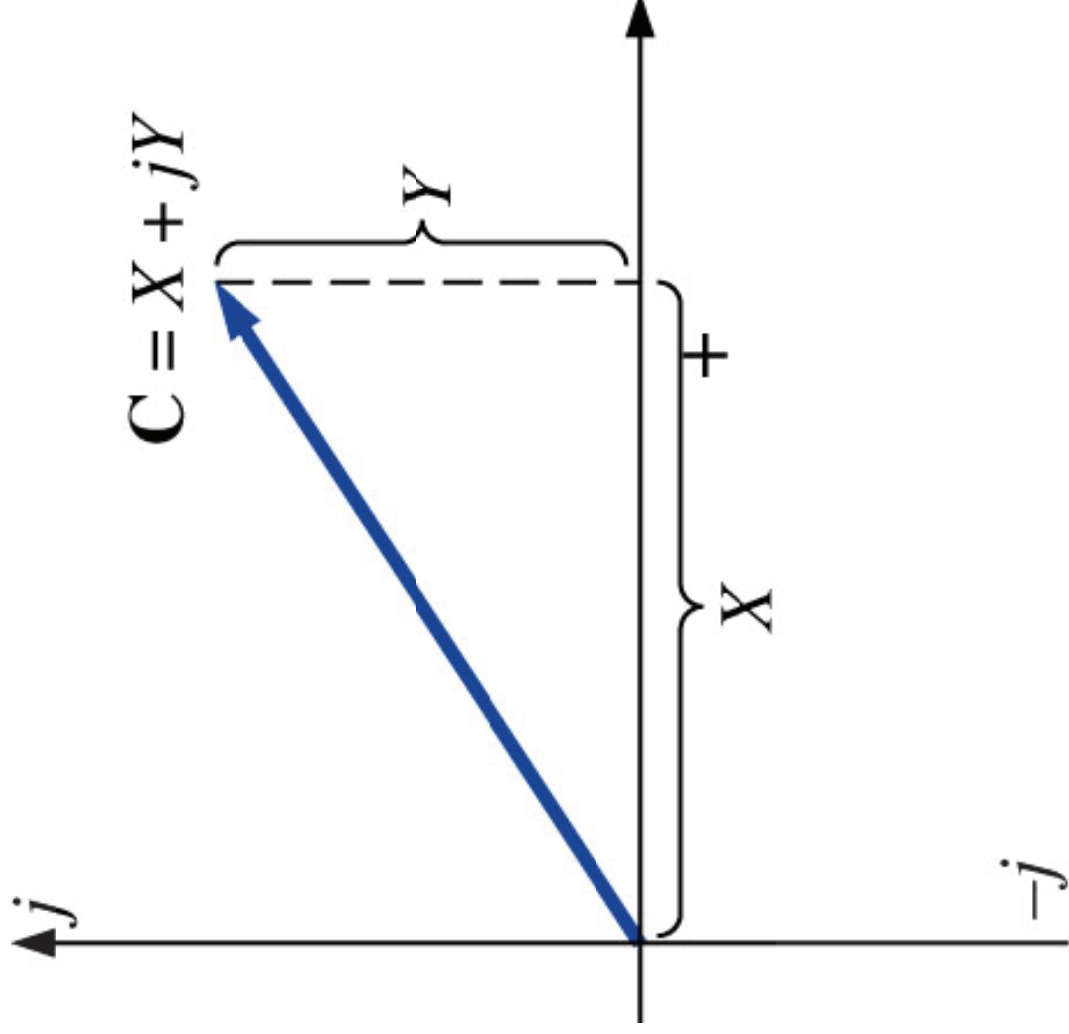
Números complexos

Um número complexo pode ser representado por um ponto num plano, referido a um sistema de eixos cartesianos.



Forma retangular

$$C = X + j \cdot Y$$



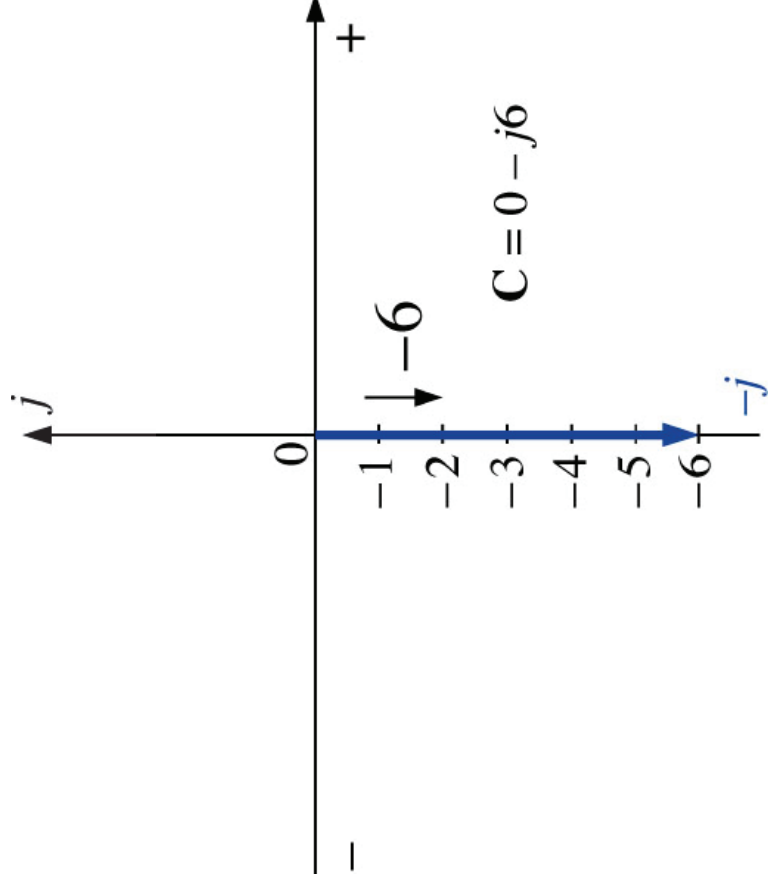
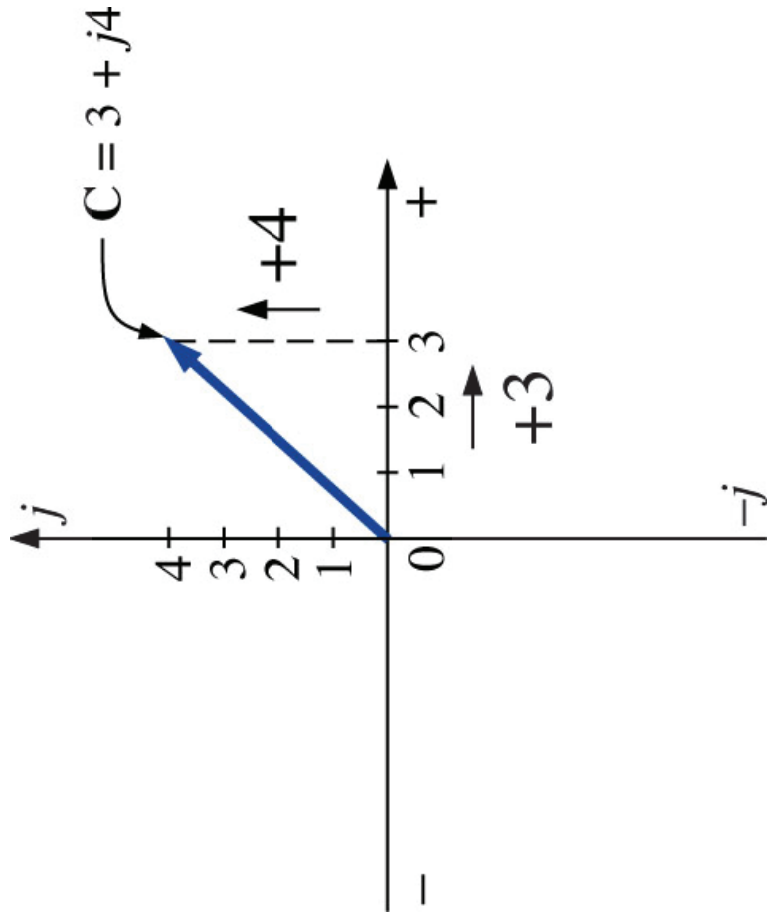
Forma retangular

Exemplo 14.13: Represente os seguintes números no plano complexo:

a) $C = 3 + j4$

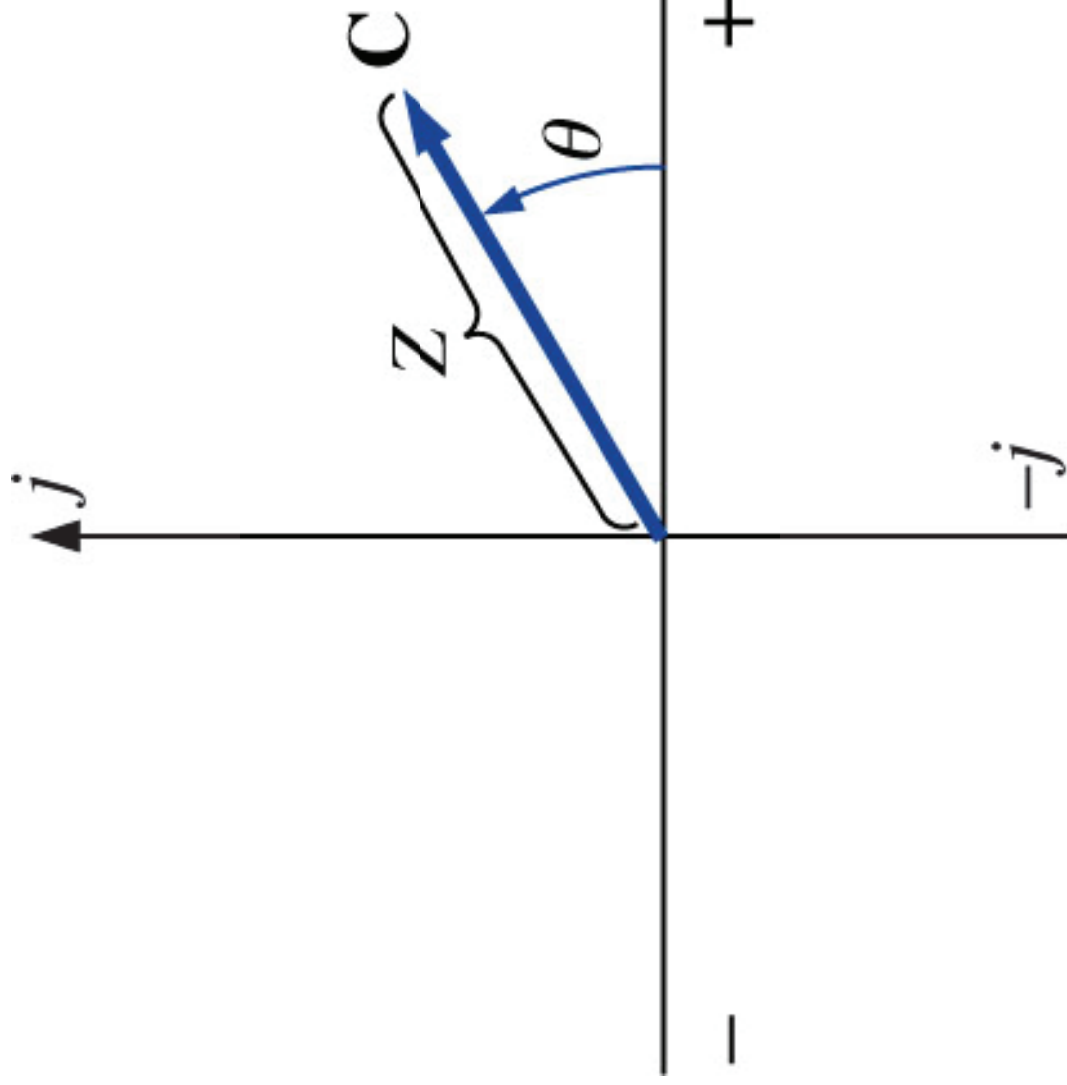
b) $C = 0 - j6$

c) $C = -10 - j20$



Forma polar

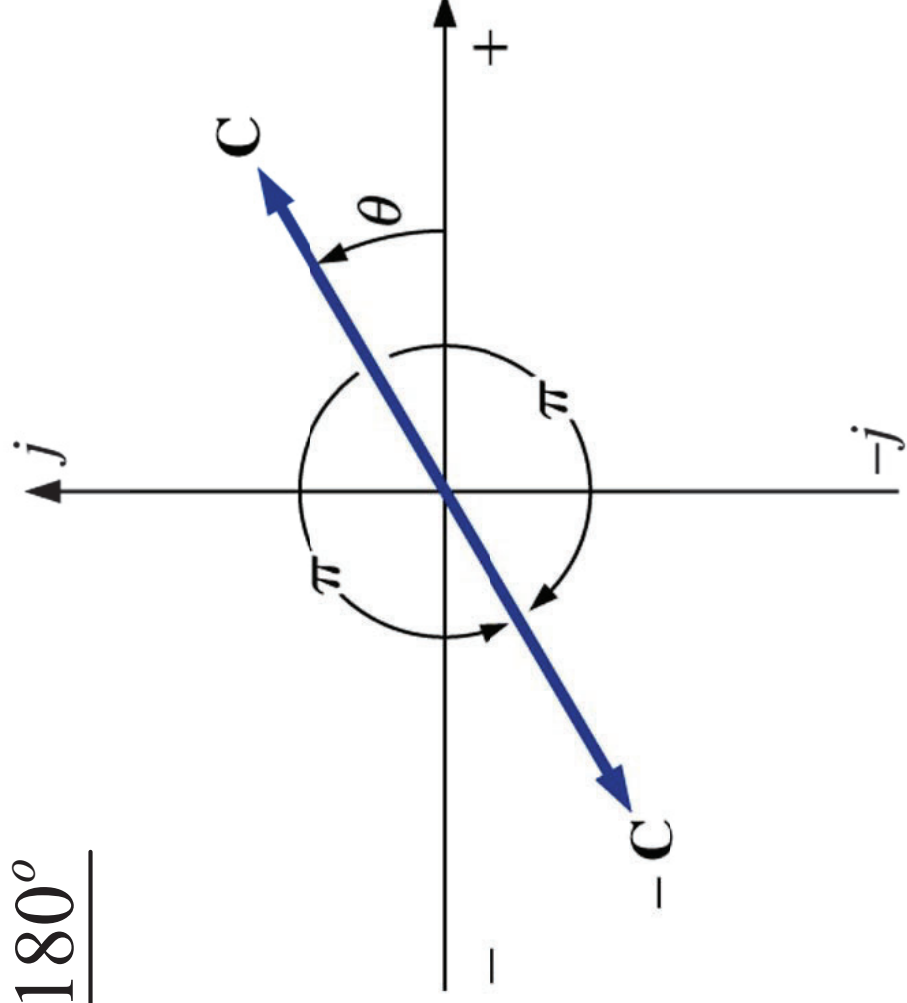
$$C = Z \angle \theta$$



Forma polar

Efeito do sinal negativo:

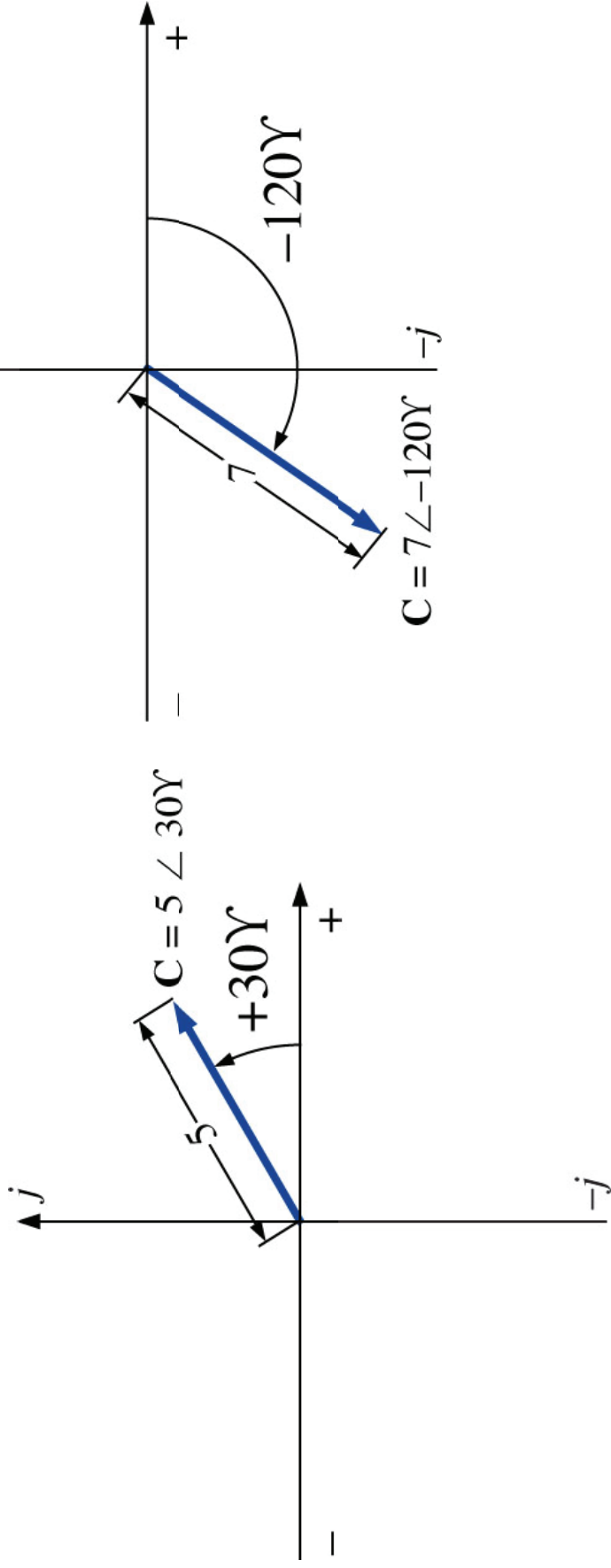
$$-C = -Z|\theta = Z|\theta \pm 180^\circ$$



Forma polar

Exemplo 14.14: Represente os seguintes números no plano complexo:

- a) $C = 5 \angle 30^\circ$
- b) $C = 7 \angle -120^\circ$
- c) $C = -4,2 \angle 60^\circ$



Conversão entre formas

Retangular para polar

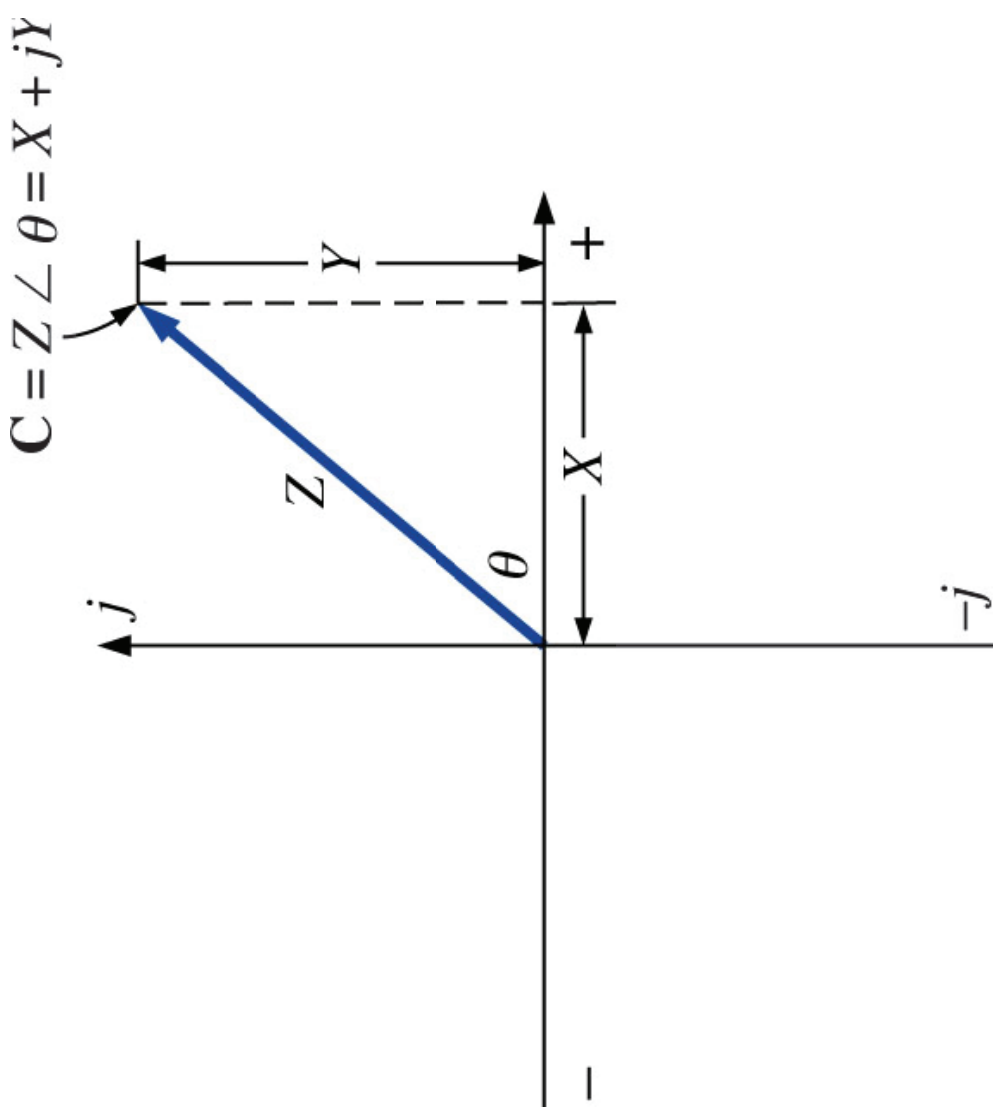
$$Z = \sqrt{X^2 + Y^2}$$

$$\theta = \operatorname{tg}^{-1} \left(\frac{Y}{X} \right)$$

Polar para retangular

$$X = Z \cdot \cos(\theta)$$

$$Y = Z \cdot \operatorname{sen}(\theta)$$



Conversão entre formas

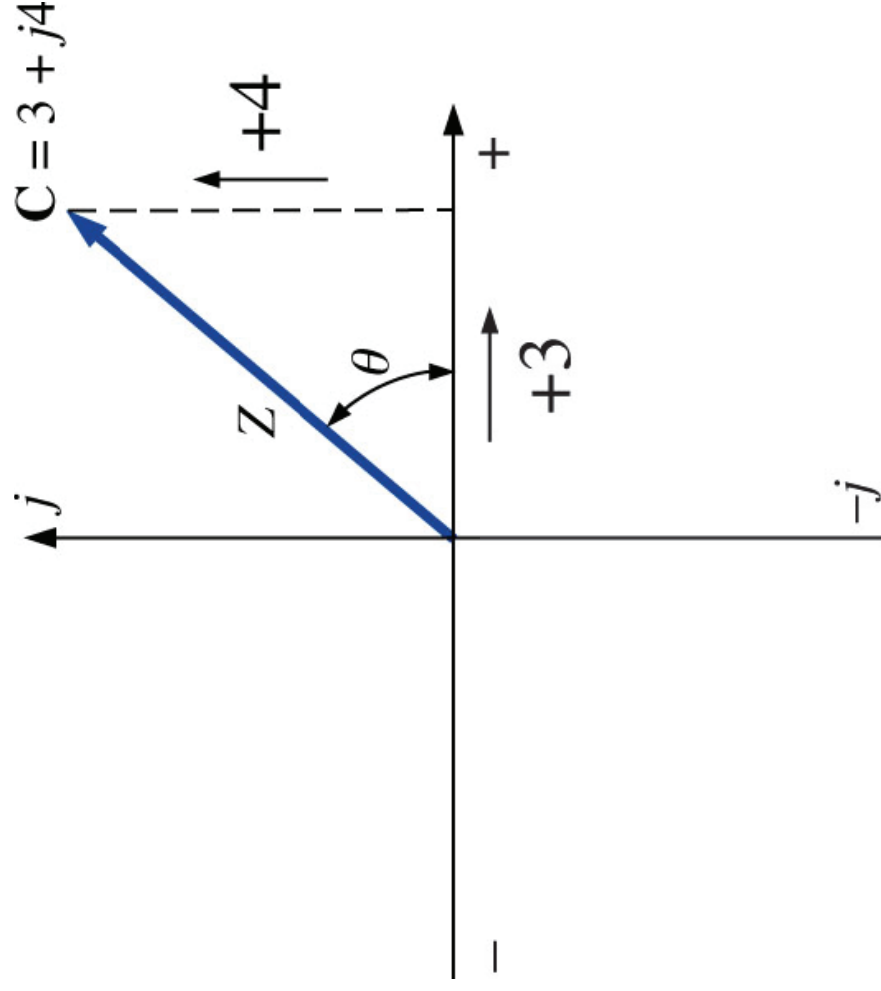
Exemplo 14.15: Converta o número complexo a seguir para a forma polar:

$$C = 3 + j4$$

$$Z = \sqrt{3^2 + 4^2} = 5$$

$$\theta = \operatorname{tg}^{-1} \left(\frac{4}{3} \right) = 53,13^\circ$$

$$C = 5 \underline{53,13^\circ}$$



Conversão entre formas

Exemplo 14.16: Converta o número complexo a seguir para a forma retangular:

$$C = 10 \angle 45^\circ$$

$$X = 10 \cdot \cos(45^\circ) = 7,07$$

$$Y = 10 \cdot \text{sen}(45^\circ) = 7,07$$

$$C = 7,07 + j7,07$$

