

Appendix C

Elements of Complex Algebra

$$\bar{z} = a + jb = z e^{j\theta} = \sqrt{a^2 + b^2} e^{j \arctan(b/a)}$$

$$\bar{z}_1 + \bar{z}_2 = (a_1 + a_2) + j(b_1 + b_2)$$

$$\bar{z}_1 \bar{z}_2 = z_1 z_2 e^{j(\theta_1 + \theta_2)}$$

$$\bar{z}^* = (a - jb) = z e^{-j\theta}$$

$$\bar{z} \bar{z}^* = z^2$$

$$\frac{1}{\bar{z}} = \frac{e^{-j\theta}}{z}$$

$$\sqrt{\bar{z}} = \pm \sqrt{z} e^{j(\theta/2)}$$

$$\bar{z}^n = z^n e^{jn\theta}$$

$$\cos \theta = \frac{e^{+j\theta} + e^{-j\theta}}{2}$$

$$\sin \theta = \frac{e^{+j\theta} - e^{-j\theta}}{2j}$$

$$\cos(j\theta) = \cosh \theta$$

$$\sin(j\theta) = j \sinh \theta$$