the same. Insertion of either in the formula

$$\frac{Y}{G_0} = -\frac{2\Gamma}{1+\Gamma} \tag{12.34}$$

will produce the equivalent normalized admittance of the iris (see Section 6.5).

12.5 THE INDUCTIVE IRIS: STATIONARY SOLUTION

Let us return to the integral equation (12.28), which contains the unknown iris current distribution $K_y(x')$. With the $m = 1$ term pulled out of the summation, we have

$$\frac{a}{\pi} A_{10} \sin\frac{\pi x}{a} - \frac{1}{\beta_{10} a} \sin\frac{\pi x}{a} \int_0^w K_y(x') \sin\frac{\pi x'}{a}\, dx' + \sum_{m=2}^{\infty} \frac{\sin(m\pi x/a)}{j\gamma_{m0} a} \int_0^w K_y(x') \sin\frac{m\pi x'}{a}\, dx' = 0 \tag{12.35}$$

If (12.26) is utilized in (12.35) for the case $m = 1$, we obtain

$$(A_{10} + B'_{10}) \sin\frac{\pi x}{a} = -\frac{\pi}{a} \sum_{m=2}^{\infty} \frac{\sin(m\pi x/a)}{j\gamma_{m0} a} \int_0^w K_y(x') \sin\frac{m\pi x'}{a}\, dx' \tag{12.36}$$

Since $A_{10} = B'_{10}/\Gamma$, manipulation of (12.36) yields

$$\begin{aligned} 2B'_{10} \frac{1+\Gamma}{2\Gamma} \sin\frac{\pi x}{a} &= \frac{2(\pi/a)}{(\beta_{10} a)(Y/G_0)} \sin\frac{\pi x}{a} \int_0^w K_y(x') \sin\frac{\pi x'}{a}\, dx' \\ &= -\frac{\pi}{a} \sum_{m=2}^{\infty} \frac{\sin(m\pi x/a)}{j\gamma_{m0} a} \int_0^w K_y(x') \sin\frac{m\pi x'}{a}\, dx' \end{aligned} \tag{12.37}$$

where Y/G_0 is the equivalent admittance of the iris.

When both sides of (12.37) are multiplied by $K_y^*(x)$ followed by integration over $[0,w]$, one obtains

$$\frac{Y}{G_0} = -2j \frac{\int_0^w K_y(x') \sin(\pi x'/a)\, dx' \int_0^w K_y^*(x) \sin(\pi x/a)\, dx}{\sum_{m=2}^{\infty} (\beta_{10}/\gamma_{m0}) \int_0^w K_y(x') \sin(m\pi x'/a)\, dx' \int_0^w K_y^*(x) \sin(m\pi x/a)\, dx} \tag{12.38}$$

In like fashion, proceeding from the integral equation (12.33), which contains the unknown aperture field $\mathcal{E}_y(x')$, we find that

$$\frac{Y}{G_0} = -2j \frac{\sum_{m=2}^{\infty} (\gamma_{m0}/\beta_{10}) \int_w^a \mathcal{E}_y(x') \sin(m\pi x'/a)\, dx' \int_w^a \mathcal{E}_y^*(x) \sin(m\pi x/a)\, dx}{\int_w^a \mathcal{E}_y(x') \sin(\pi x'/a)\, dx' \int_w^a \mathcal{E}_y^*(x) \sin(\pi x/a)\, dx} \tag{12.39}$$