$$2\left(L+2L_f\right)\frac{d\tilde{i}_c^k}{dt}(t) = +2V_{dc0}\tilde{e}_c^{k*}(t) - \tilde{v}_{dc}^{\Delta k}(t) - 4\tilde{v}_o^k(t) - 2\left(R+2R_f\right)\tilde{i}_c^k(t)$$

$$2C_{eq}\frac{d\tilde{v}_{dc}^{\Delta k}}{dt}(t) = -\frac{2S_0}{3V_{dc0}}\tilde{e}_c^{k*}(t) + \tilde{i}_c^k(t)$$

$$\xrightarrow{\mathbf{T}_{dq0}(\omega)}$$

$$2\left(L+2L_f\right)\left(\mathbf{\Omega}+s\mathbf{I}\right)\tilde{\mathbf{I}}_c^{dq0} = 2V_{dc0}\tilde{\mathbf{E}}_c^{dq0*} - \tilde{\mathbf{V}}_{dc}^{dq0\Delta} - 4\tilde{\mathbf{V}}_o^{dq0} - 2\left(R+2R_f\right)\tilde{\mathbf{I}}_c^{dq0}$$

$$2C_{eq}\left(\mathbf{\Omega}+s\mathbf{I}\right)\tilde{\mathbf{V}}_{dc}^{dq0\Delta} = -\frac{2S_0}{3V_{dc0}}\tilde{\mathbf{E}}_c^{dq0*} + \tilde{\mathbf{I}}_c^{dq0}$$

$$2C_{eq}\frac{d\tilde{v}_{dc}^{\Sigma k}}{dt}(t) = 2\tilde{i}_{cir}^k(t) - \frac{2S_0}{3V_{dc0}}\tilde{e}_{cir}^{k*}(t)$$

$$4L\frac{d\tilde{i}_{cir}^k}{dt}(t) = -4R\tilde{i}_{cir}^k(t) - \tilde{v}_{dc}^{\Sigma k}(t) + 2V_{dc0}\tilde{e}_{cir}^{k*}(t) + 2\tilde{v}_{dc}(t)$$

$$\xrightarrow{\mathbf{T}_{dq0}(2\omega)}$$

$$2C_{eq}\left(2\mathbf{\Omega}+s\mathbf{I}\right)\tilde{\mathbf{V}}_{dc}^{2dq0\Sigma} = 2\tilde{\mathbf{I}}_{cir}^{2dq0} - \frac{2S_0}{3V_{dc0}}\tilde{\mathbf{E}}_{cir}^{2dq0*}$$

$$4L\left(2\mathbf{\Omega}+s\mathbf{I}\right)\tilde{\mathbf{I}}_{cir}^{2dq0} = -4R\tilde{\mathbf{I}}_{cir}^{2dq0} - \tilde{\mathbf{V}}_{dc}^{2dq0\Sigma} + 2V_{dc0}\tilde{\mathbf{E}}_{cir}^{2dq0*} + 2\tilde{\mathbf{V}}_{dc}^{2dq0}$$