Formules

$$\sin(\alpha+\beta) = \sin\alpha\cos\beta + \cos\alpha\sin\beta$$
$$\sin(\alpha-\beta) = \sin\alpha\cos\beta - \cos\alpha\sin\beta$$
$$\cos(\alpha+\beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta$$
$$\cos(\alpha-\beta) = \cos\alpha\cos\beta + \sin\alpha\sin\beta$$
$$(fg)' = f'g + fg'$$
$$\left(\frac{1}{g}\right)' = -\frac{g'}{g^2}$$
$$\left(\frac{f}{g}\right)' = \frac{f'g - fg'}{g^2}$$

$$f(\theta_a) = a_v + \sum_{n=1}^{\infty}\left(a_n\cos(np\theta_a) + b_n\sin(np\theta_a)\right)d\theta_a$$
$$a_n = \tfrac{4p}{\pi}\int_0^{\frac{\pi}{2p}} f(\theta_a)\cos(np\theta_a)d\theta_a$$
$$b_n = \tfrac{4p}{\pi}\int_0^{\frac{\pi}{2p}} f(\theta_a)\sin(np\theta_a)d\theta_a$$
$$\mathcal{F}_{ag}(\theta_{ae}) = \tfrac{4}{\pi}\left(\tfrac{N_{\text{ph}}i_a(t)}{2p}\right)\sum_{n=1,3,5,\ldots}^{\infty}\tfrac{\sin\left(n\frac{\pi}{2}\right)}{n}k_{w_n}\cos(n\theta_{ae})$$

$$\oint_S \mathbf{B}\cdot d\mathbf{a} = 0$$
$$\int_S \mathbf{B}\cdot d\mathbf{a} = \phi$$
$$\oint_C \mathbf{H}\cdot d\mathbf{l} = Ni = \mathcal{F}$$
$$\mathbf{B} = \mu\mathbf{H}$$

$$\mathcal{F} = \phi\mathcal{R}$$
$$\mathcal{R} = \frac{\ell}{\mu A}$$

$$\mu = \mu_0\mu_r$$
$$\mu_0 = 4\pi\times10^{-7}\ \text{H/m}$$

$$B_m = \mu_R(H_m - H_c') = B_r + \mu_R H$$
$$\mu_R = \frac{B_r}{H_c'}$$
$$(Ni)_{equiv} = -H_c'd$$
$$\mathcal{R}_{equiv} = \frac{d}{\mu_R A_m}$$

$$L = \frac{N^2}{\mathcal{R}}$$

Formulas

$$\lambda = N\phi$$
$$L = \frac{\lambda}{i}$$
$$e = \frac{d\lambda}{dt}$$

$$\begin{bmatrix}\lambda_1\\ \lambda_2\end{bmatrix} = \begin{bmatrix}L_{11} & L_{12}\\ L_{21} & L_{22}\end{bmatrix}\begin{bmatrix}i_1\\ i_2\end{bmatrix}$$

$$W_{fld}(\lambda,\theta_m) = \frac{1}{2}\frac{\lambda^2}{L(\theta_m)}$$
$$T_{fld} = \left.\frac{\partial W_{fld}(\lambda,\theta_m)}{\partial\theta_m}\right|_{\lambda}$$
$$W'_{fld}(i,\theta_m) = \frac{1}{2}L(\theta_m)i^2$$
$$T_{fld} = \left.\frac{\partial W'_{fld}(i,\theta_m)}{\partial\theta_m}\right|_{i}$$

$$\theta_{me} = p\theta_m$$
$$\omega_e = p\omega_m$$
$$\omega_m = \frac{2\pi}{60}n_m$$
$$p = \frac{\text{poles}}{2}$$
$$n_s = \frac{60f_e}{p}$$
$$s = \frac{n_s - n_m}{n_s}$$
$$P_m = \omega_m T_m$$

$$E_a = K_a\phi_d\omega_m$$
$$T_m = K_a\phi_d I_a$$
$$T_b = b_m\omega_m$$
$$T_J = J_m\frac{d\omega_m}{dt}$$

$$\eta = \frac{P_{out}}{P_{in}}\times100\%$$

$$I_{base_{1\phi}} = \frac{S_{base_{3\phi}}}{3V_{base_{1\phi}}}$$
$$Z_{base} = \frac{V_{base_{1\phi}}}{I_{base_{1\phi}}}$$