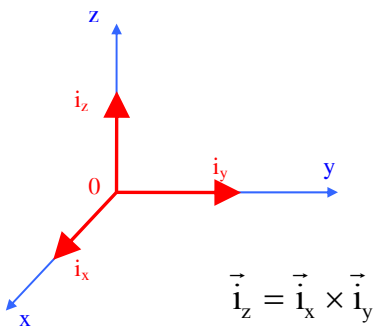
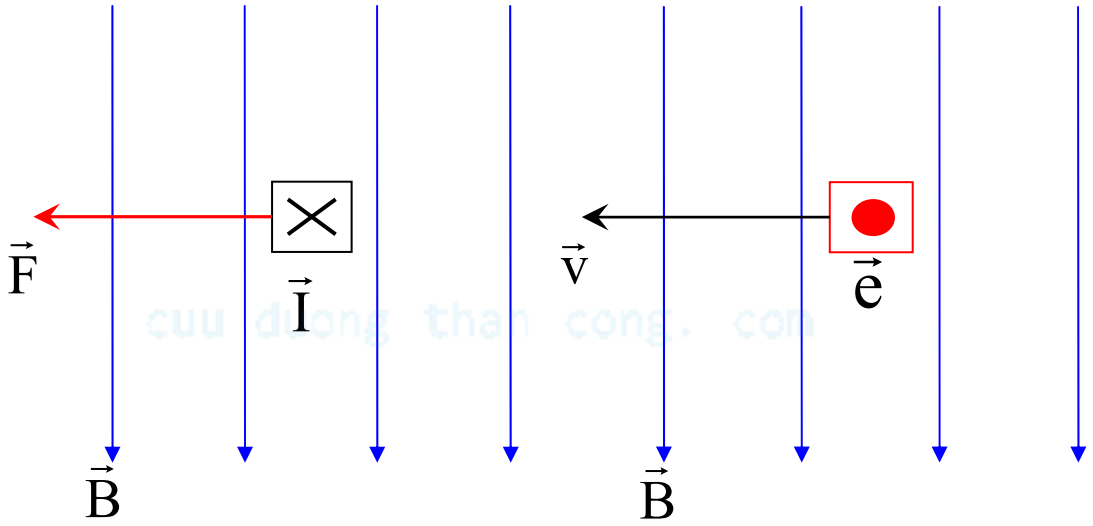
CƠ BẢN VỀ BIẾN ĐỔI NĂNG LƯỢNG ĐIỆN CƠ

Lực điện từ và sức điện động



Tích có hướng

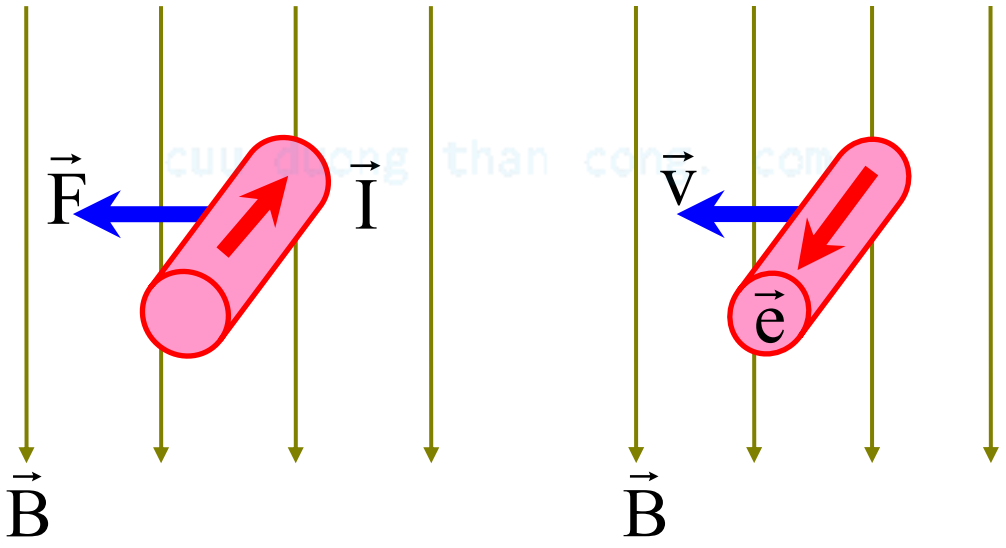


Định luật Bio-Savart:

$$\vec{F}e = I\left(\vec{l} \times \vec{B}\right)$$

Định luật Faraday:

$$\vec{e} = \left(\vec{v} \times \vec{B}\right)l$$

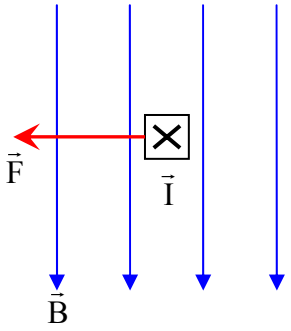


Định luật Bio-Savart:

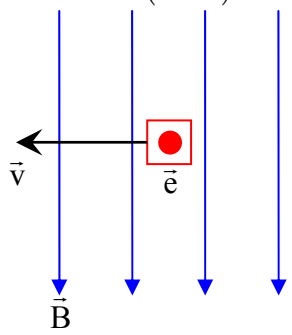
$\vec{F}e = I(\vec{l} \times \vec{B})$ $F_e = IlB$

Định luật Faraday:

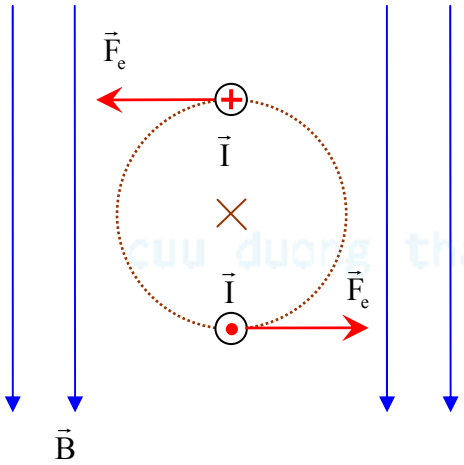
$\vec{e} = (\vec{v} \times \vec{B})l$ $e = vBl$



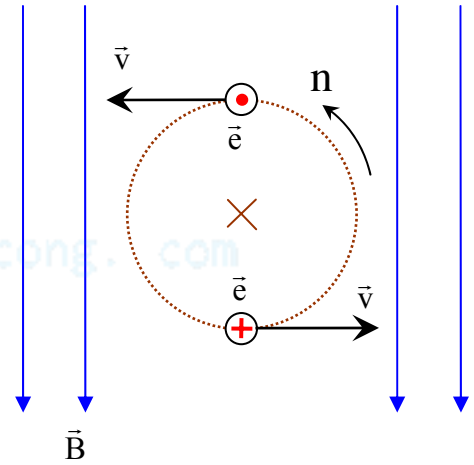
$\vec{F}e = I(\vec{l} \times \vec{B})$



$\vec{e} = (\vec{v} \times \vec{B})l$

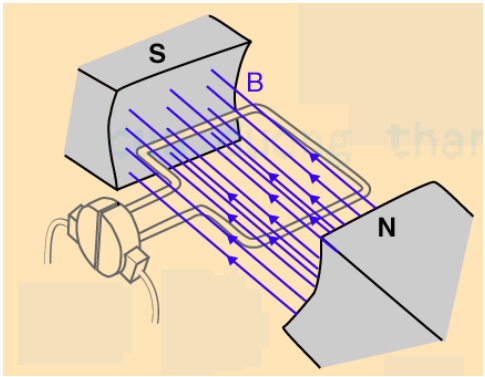


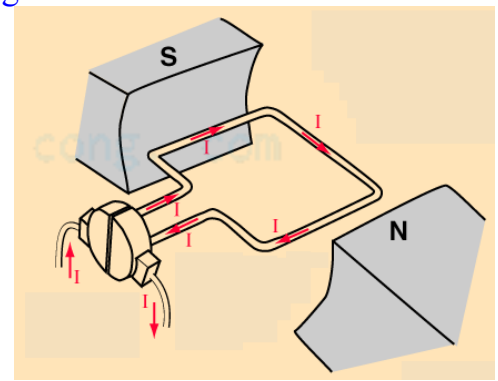
Động cơ

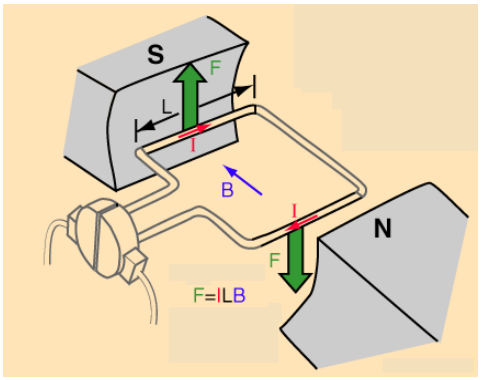


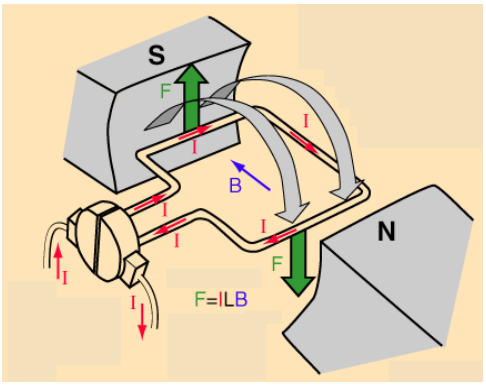
Máy phát .

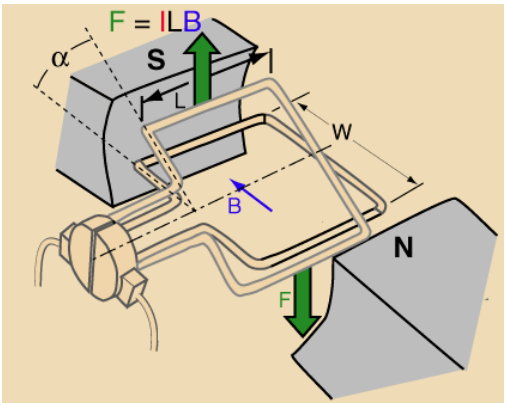
Động cơ

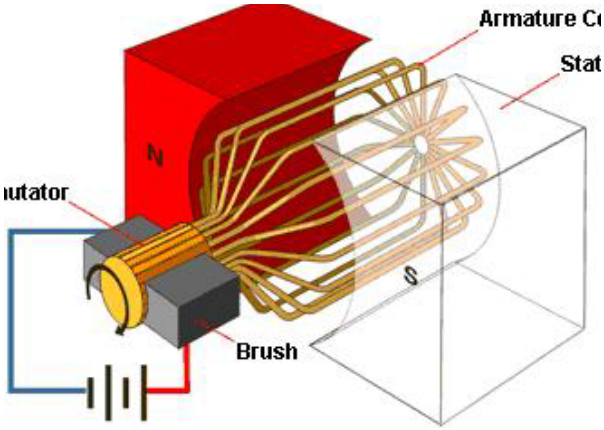


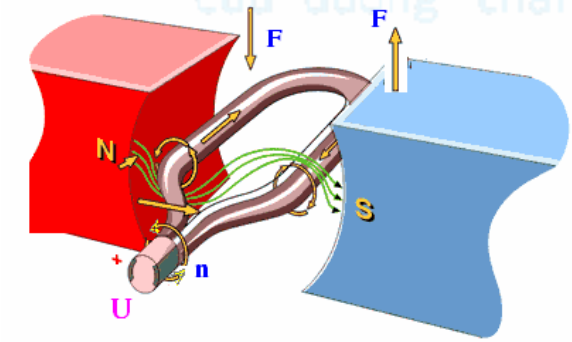


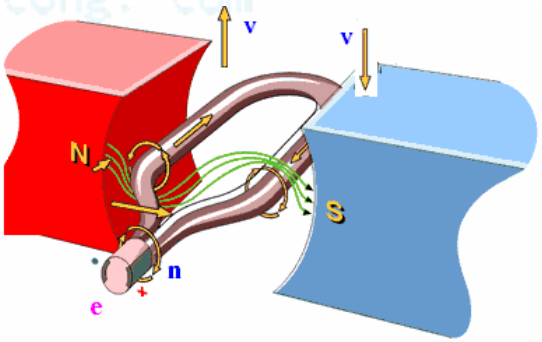






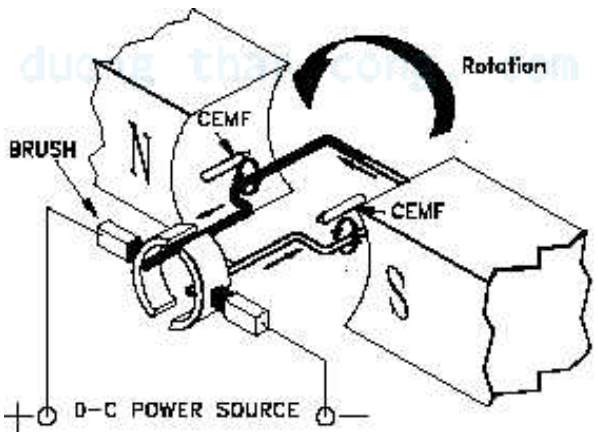




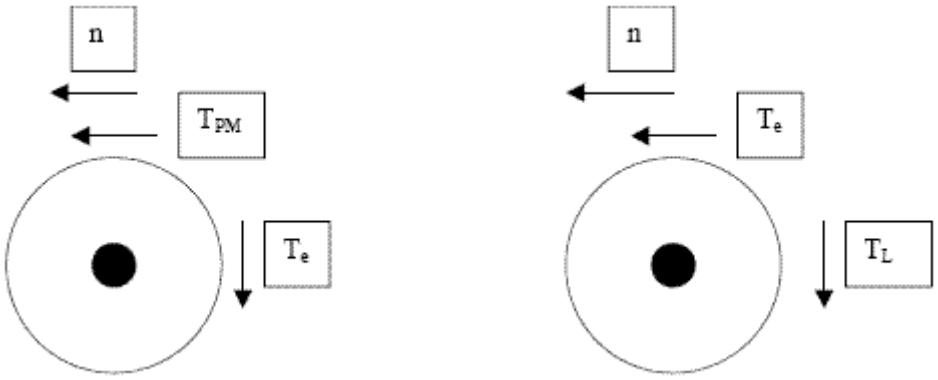


Động cơ

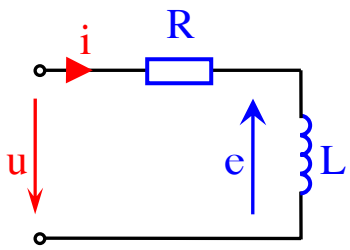
Máy phát .

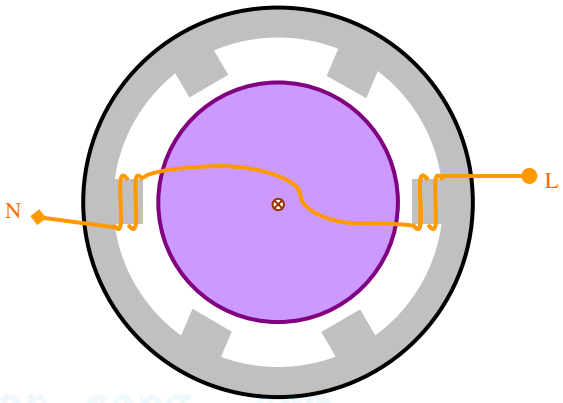


Máy phát

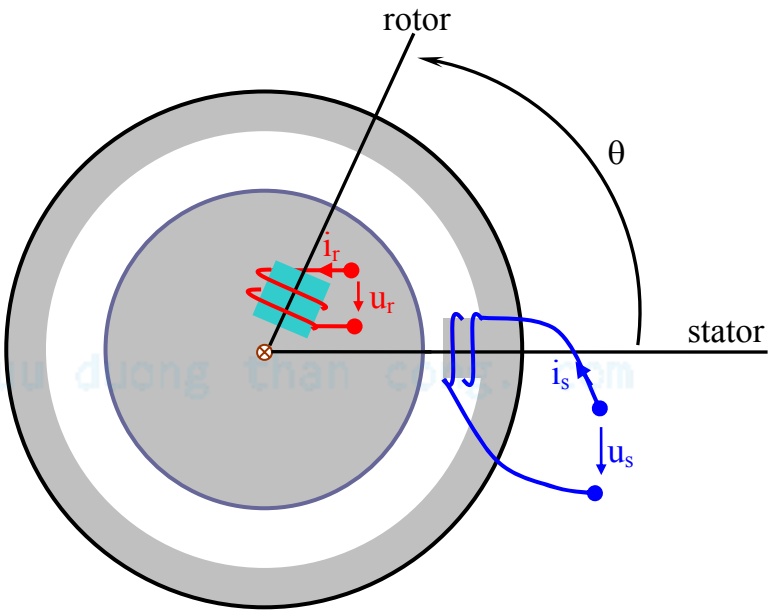


Máy phát *Momen và tốc độ* Động cơ .

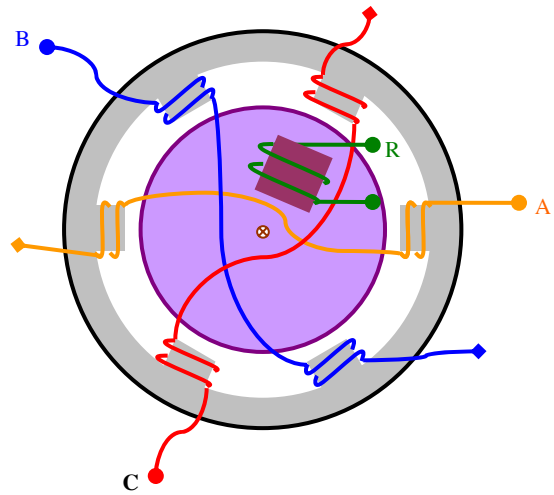


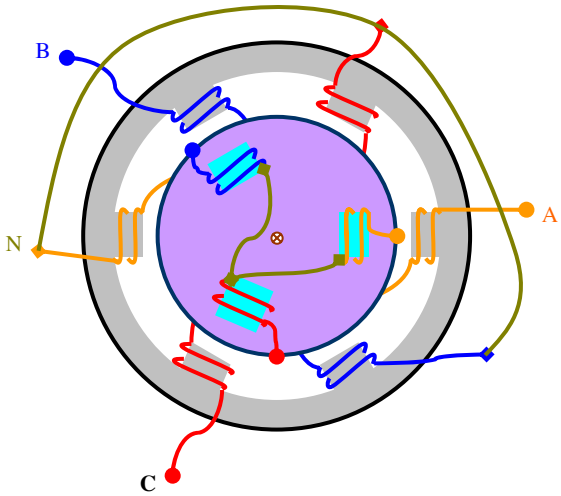


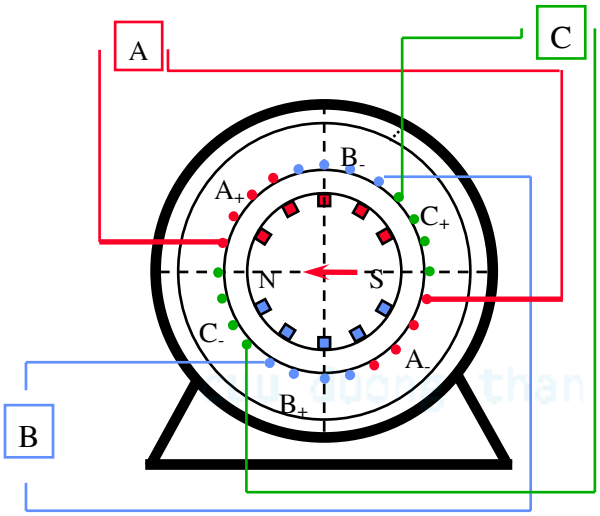
$$u(t) = Ri(t) - e(t) = Ri(t) + \frac{d\psi(t)}{dt} \quad \text{với} \quad \psi = Li$$



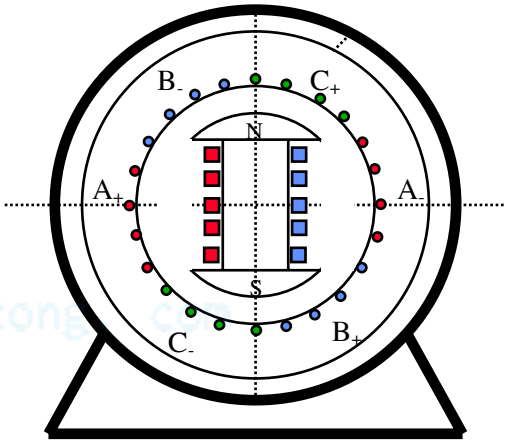
$$\psi_s = L_s i_s + L_{sr} i_r$$
$$\psi_r = L_{rs} i_s + L_r i_r$$



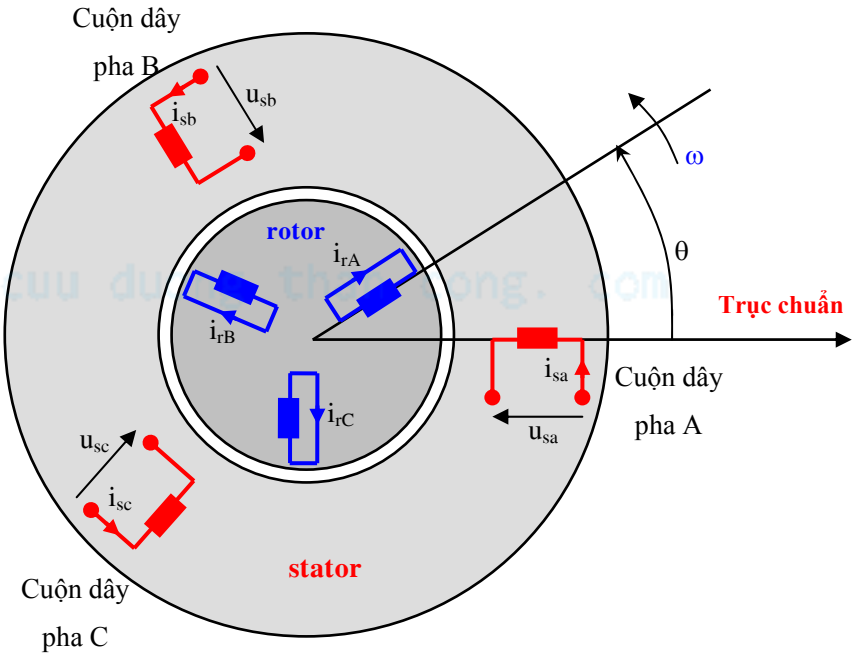


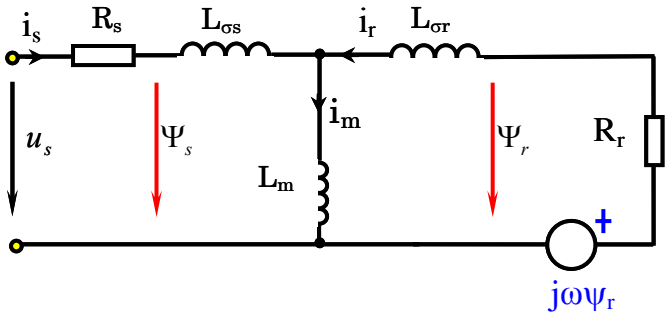


Rotor cực từ ẩn



Rotor cực từ lồi

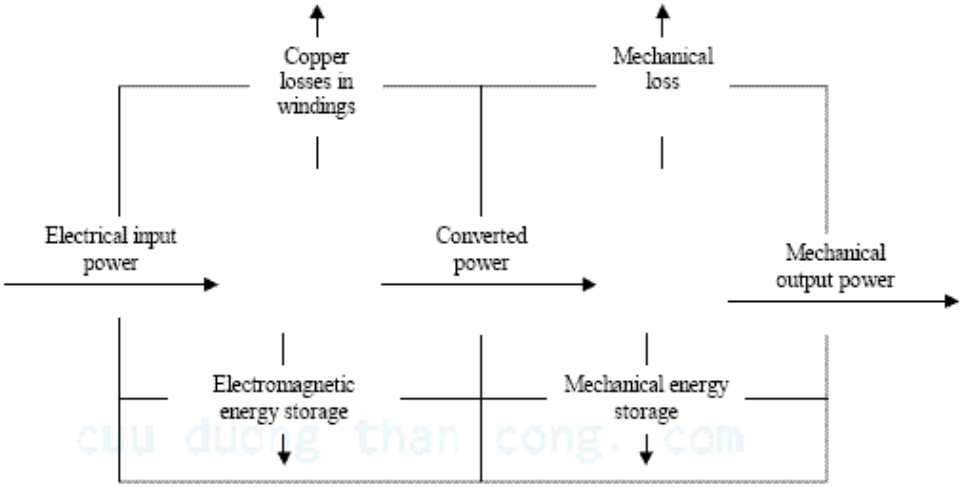




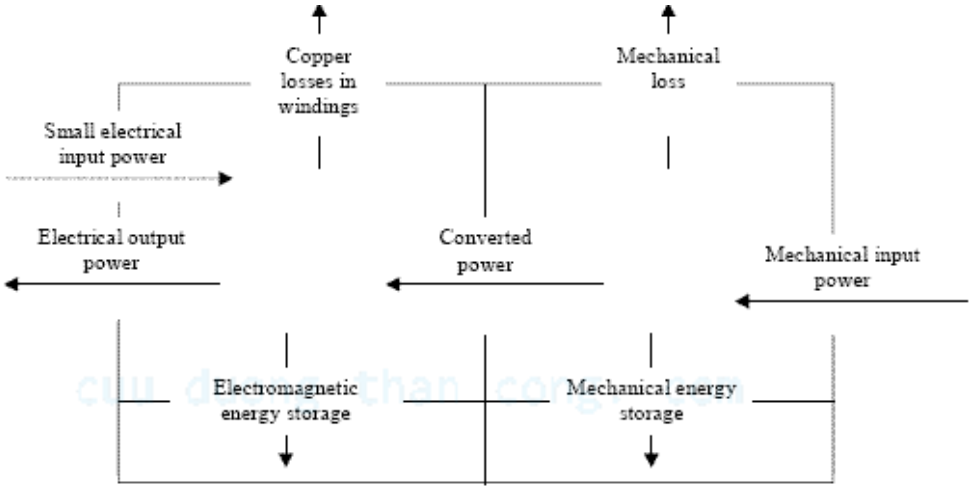
$$u_s(t) = R_s i_s(t) + \frac{d\psi_s(t)}{dt}$$

$$i_m(t) = i_s(t) + i_r(t)$$

II. Phân bố công suất trong máy điện



Động cơ



Máy phát

$$\underline{R} = \begin{bmatrix} R_1 & & & & & \\ & R_2 & & & & \\ & & .. & & & \\ & & & .. & & \\ & & & & R_{n-1} & \\ & & & & & R_n \end{bmatrix} \qquad \underline{L} = \begin{bmatrix} L_1 & L_{12} & L_{13} & .. & .. & L_{1n} \\ L_{21} & L_2 & L_{23} & .. & .. & L_{2n} \\ L_{31} & L_{32} & L_{33} & .. & .. & L_{3n} \\ .. & .. & .. & .. & .. & .. \\ .. & .. & .. & .. & .. & .. \\ L_{n1} & L_{n2} & L_{n3} & .. & .. & L_{nn} \end{bmatrix}$$

$$\underline{v} = \begin{bmatrix} v_1 \\ v_2 \\ v_3 \\ .. \\ .. \\ v_n \end{bmatrix} \qquad \underline{i} = \begin{bmatrix} i_1 \\ i_2 \\ i_3 \\ .. \\ .. \\ i_n \end{bmatrix} \qquad \underline{\psi} = \begin{bmatrix} \psi_1 \\ \psi_2 \\ \psi_3 \\ .. \\ .. \\ \psi_n \end{bmatrix}$$

$$\underline{v} = \underline{R}\underline{i} + \frac{d\underline{\psi}}{dt}$$

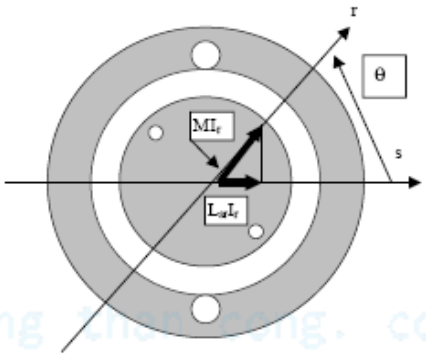
$$\underline{\psi} = \underline{L}\underline{i}$$

$$t_e + t_m = J\frac{d\omega}{dt} + k\omega \qquad t_m = \begin{cases} -T_L, & t_e > 0 \quad \text{motoring} \\ T_{PM} & t_e < 0 \quad \text{generation} \end{cases}$$

$$t_e = \frac{1}{2}\underline{i}^T \frac{d\underline{L}}{d\theta}\underline{i}$$

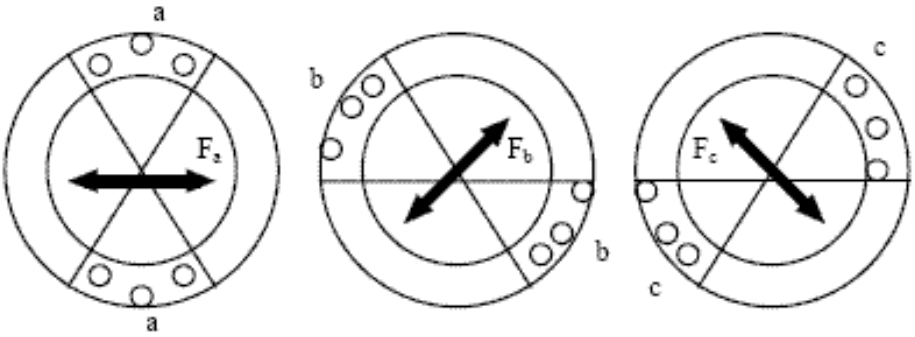
$$\omega = d\theta/dt$$

IV. Sức điện động trong máy điện

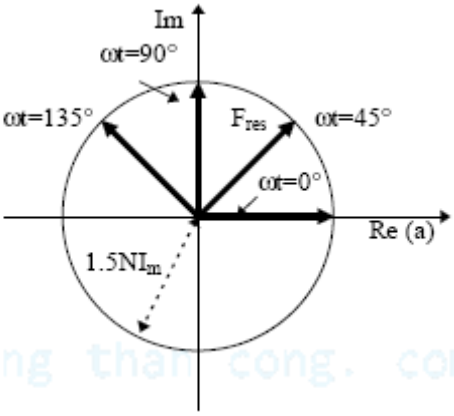


Angle θ [°]	0	90	180	270	360
$L_{sr}\, I_r$	MI_r	0	$-MI_r$	0	MI_r

V. Từ trường quay trong máy điện 3 pha



Từ trường 3 pha



Từ trường quay

Các công thức lượng giác:

$2\sin^2\alpha = 1 - \cos 2\alpha$

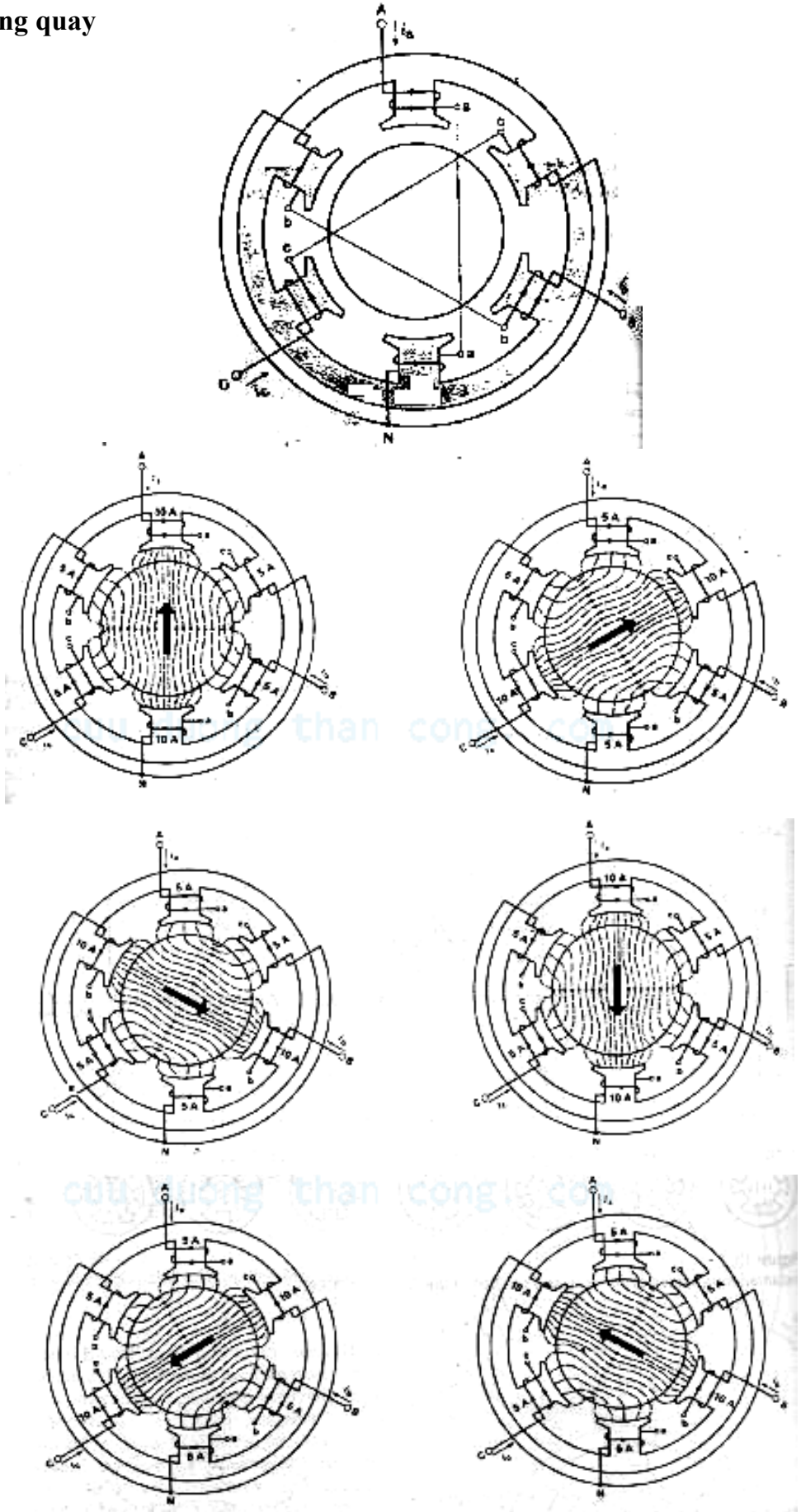
$\cos(\alpha+\beta) = \cos\alpha.\cos\beta - \sin\alpha.\sin\beta$

$\sin(\alpha-\beta) = \sin\alpha.\cos\beta - \cos\alpha.\sin\beta$

$\sin\alpha.\cos\beta = \frac{1}{2}[\sin(\alpha+\beta) + \sin(\alpha-\beta)]$

$A.\sin\alpha\cos\beta + B.\cos\alpha\sin\beta = \frac{1}{2}(A+B).\sin(\alpha+\beta) + \frac{1}{2}(A-B).\sin(\alpha+\beta)$

Từ trường quay



Các công thức lượng giác:

$2\sin^2\alpha = 1 - \cos 2\alpha$

$\cos(\alpha+\beta) = \cos\alpha.\cos\beta - \sin\alpha.\sin\beta$

$\sin(\alpha-\beta) = \sin\alpha.\cos\beta - \cos\alpha.\sin\beta$

$\sin\alpha.\cos\beta = \frac{1}{2}[\sin(\alpha+\beta) + \sin(\alpha-\beta)]$

$A.\sin\alpha\cos\beta + B.\cos\alpha\sin\beta = \frac{1}{2}(A+B).\sin(\alpha+\beta) + \frac{1}{2}(A-B).\sin(\alpha-\beta)$