

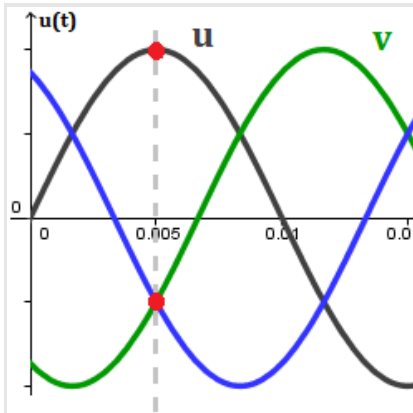
AC

FREMSTILLING AF

3-FASET

VEKSELSPÆNDING

- Generatorprincippet
- Ækvivalent skema & vektordiagrammet



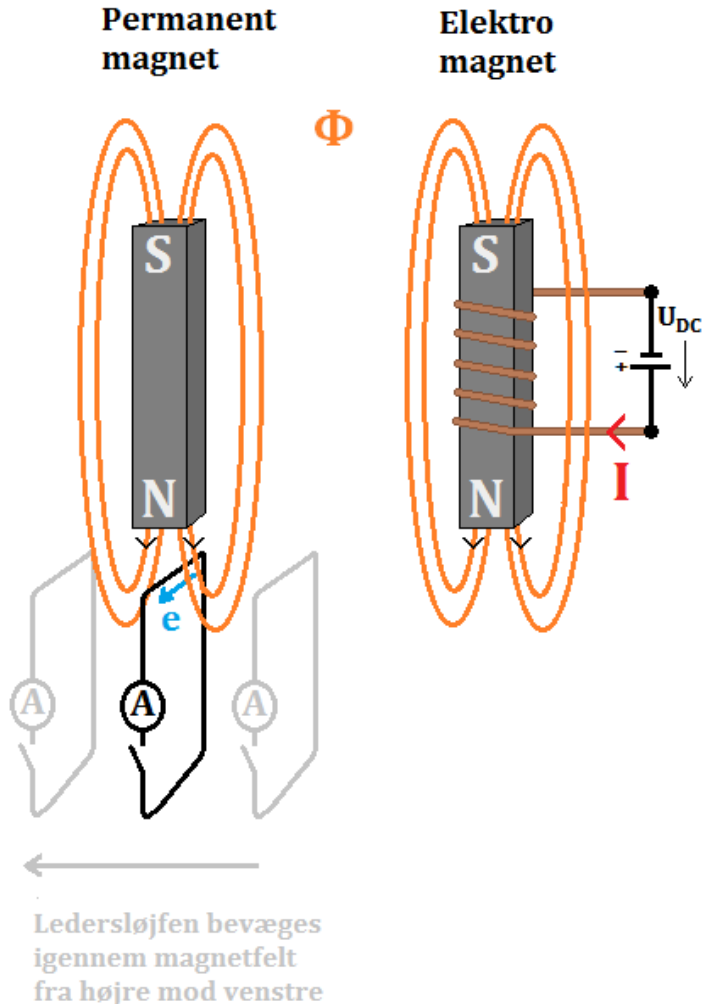
KELD DÝRMOSE



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AC Frembringelse af vekselspænding



Induktion:

Der induceres en elektromotorisk kraft i en ledersløjfe, hvis denne udsættes for et varierende magnetfelt:

$$e = -\frac{d\Phi}{dt} \cdot N \quad [V] = \left[\frac{Wb}{s} \right]$$

Det ydre magnetfelt kan frembringes på 2 måder:

- Permanent magnet
- Elektromagnet

Når der tilsluttes en spændingskilde vil der løbe en strøm, som frembringer et felt, hvis retning kan bestemmes efter "gribereglen":

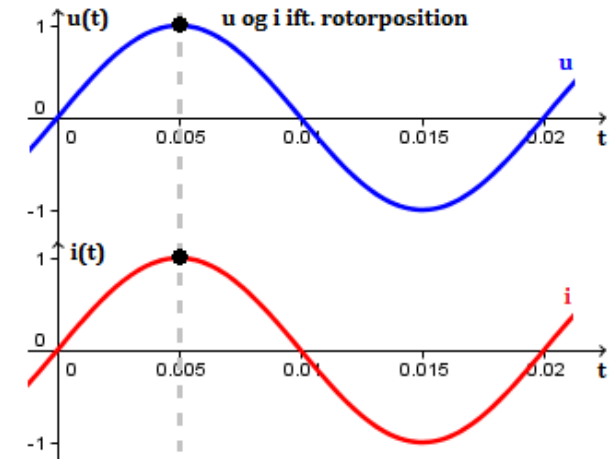
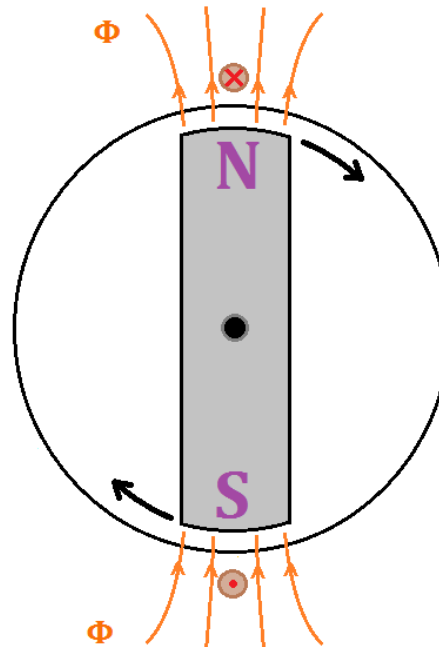
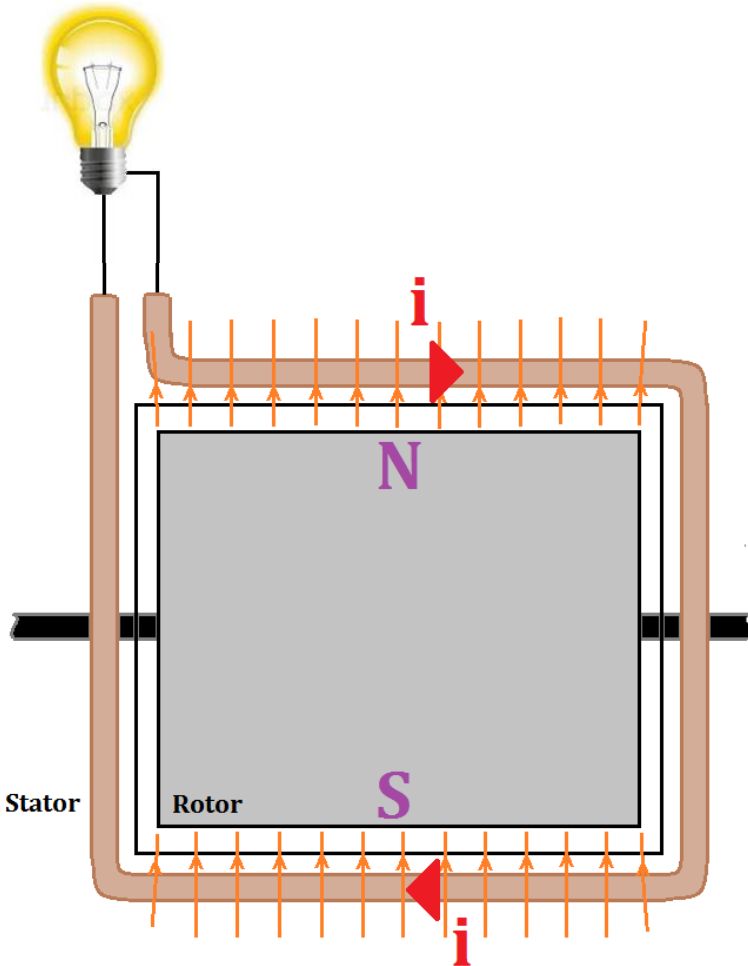
AC Frembringelse af vekselspænding

Vikling i varierende magnetfelt

Den inducerede elektromotorisk kraft (e):

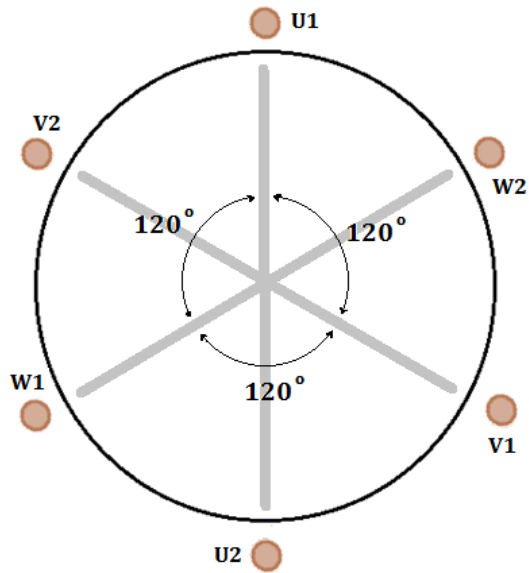
$$e = -\frac{d\Phi}{dt} \cdot N \quad [V] = \left[\frac{Wb}{s} \right]$$

(e retning ifølge generatorregel)



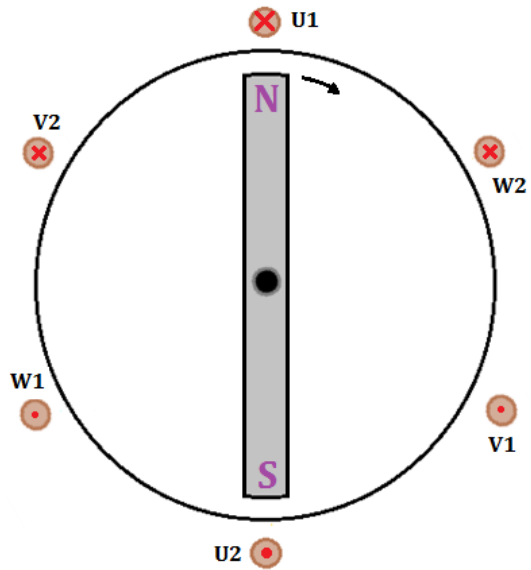
AC Frembringelse af 3 faset vekselspænding

3 Viklinger forskudt 120°



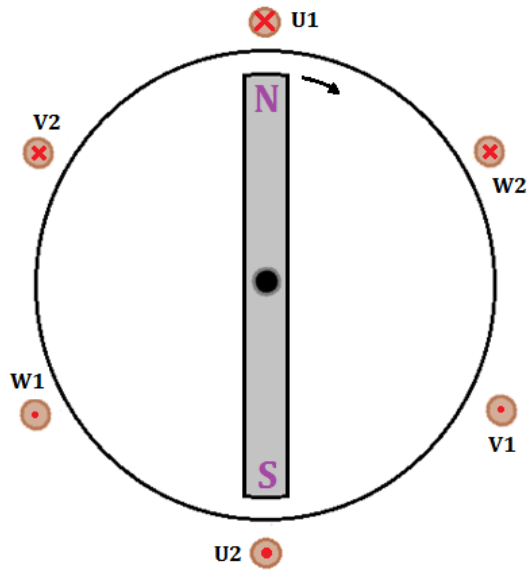
AC Frembringelse af 3 faset vekselspænding

3 faset generator (princip)

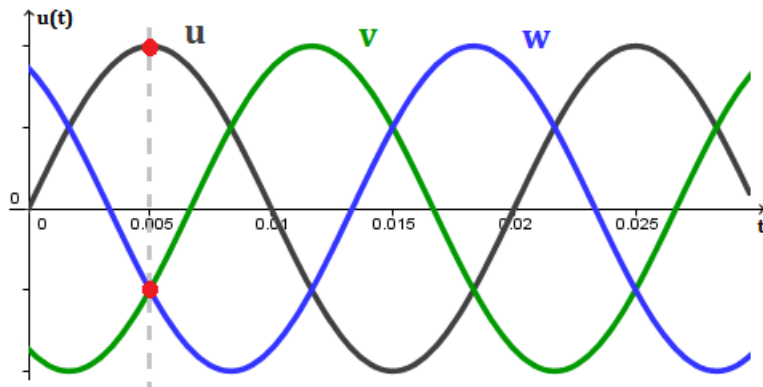


AC Frembringelse af 3 faset vekselspænding

3 faset generator (princip)



Sinuskurven:

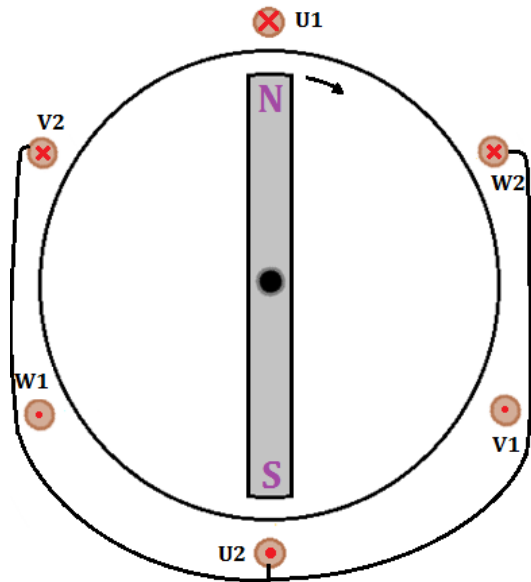


$$\begin{aligned} u(t) &= \sin(2\pi 50 t) \\ v(t) &= \sin\left(2\pi 50 t - \frac{\pi}{1.5}\right) \\ w(t) &= \sin\left(2\pi 50 t + \frac{\pi}{1.5}\right) \end{aligned}$$

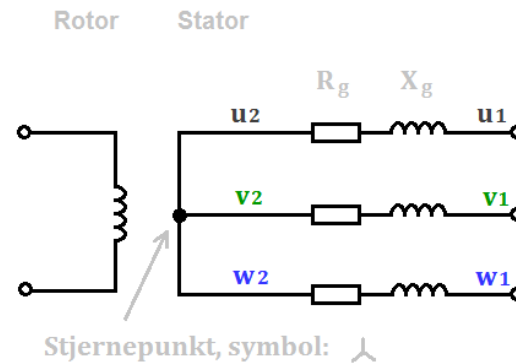
Side 5

AC Frembringelse af 3 faset vekselspænding

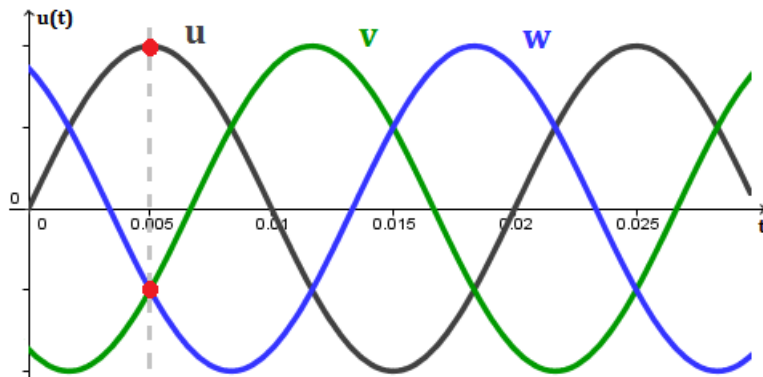
3 faset generator (princip)



Ækvivalent skema:



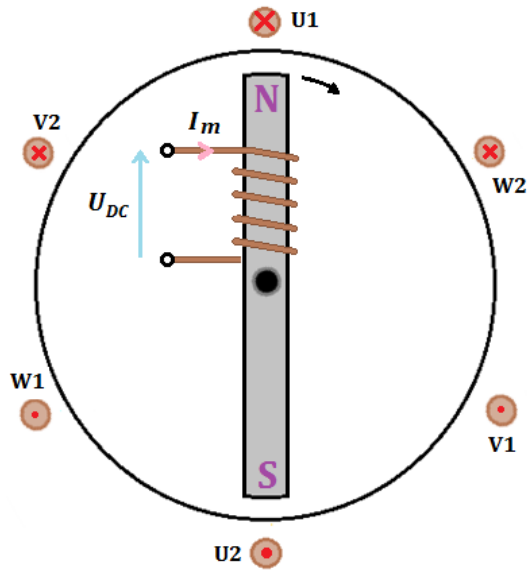
Sinuskurven:



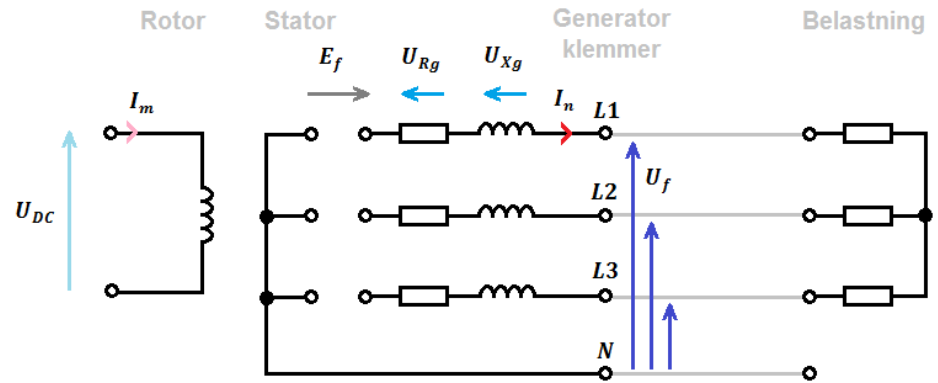
Side 6

AC Frembringelse af 3 faset vekselspænding

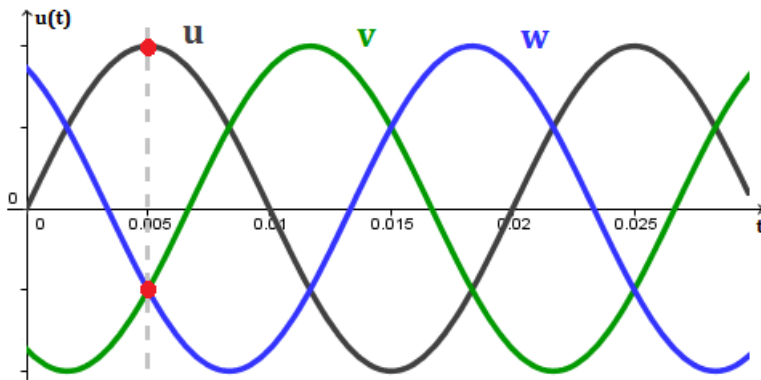
3 faset generator (princip)



Ækvivalent skema:



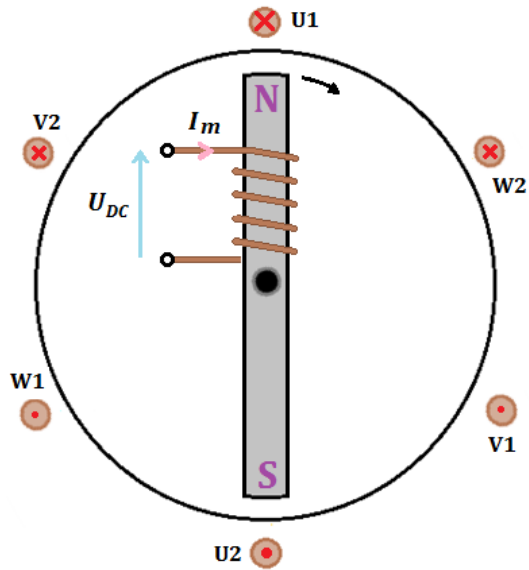
Sinuskurven:



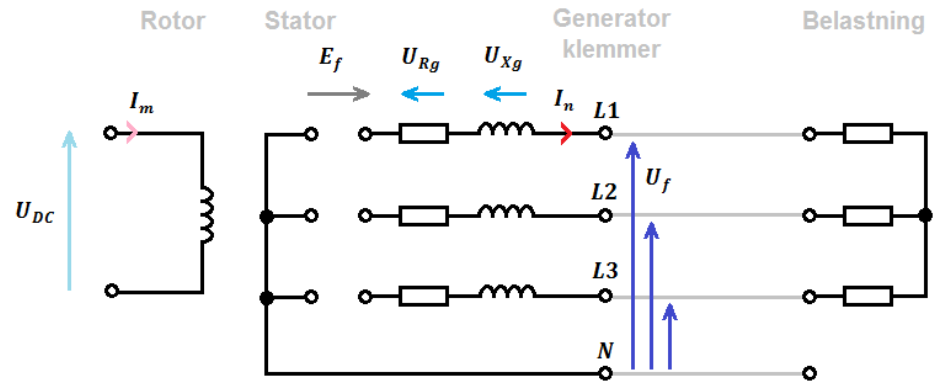
Side 7

AC Frembringelse af 3 faset vekselspænding

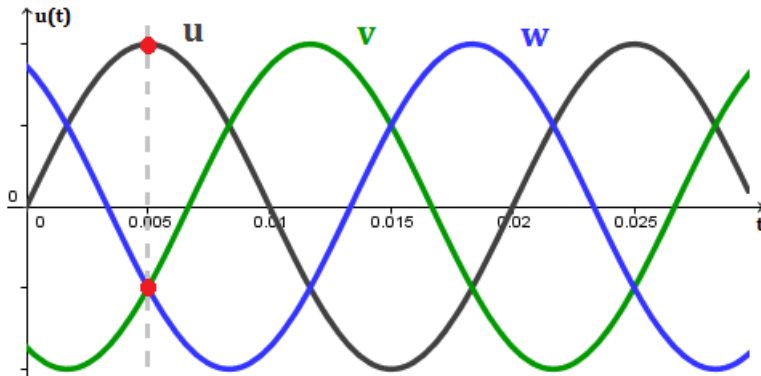
3 faset generator (princip)



Ækvivalent skema:

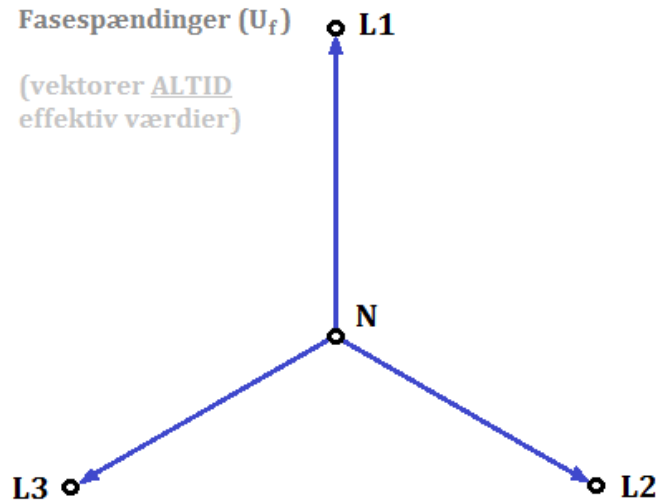


Sinuskurven:



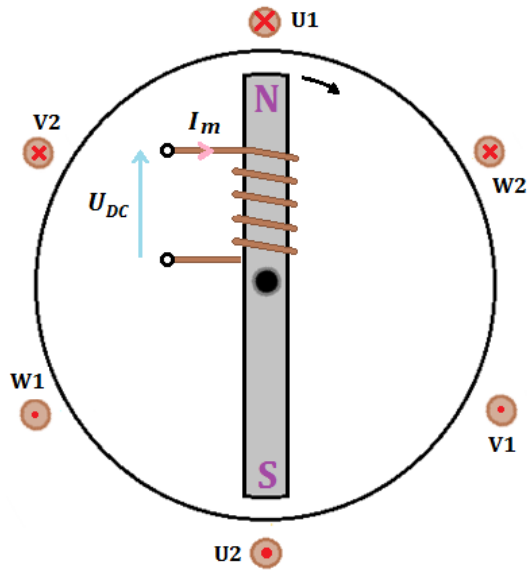
Side 8

Vektordiagram - spændinger:

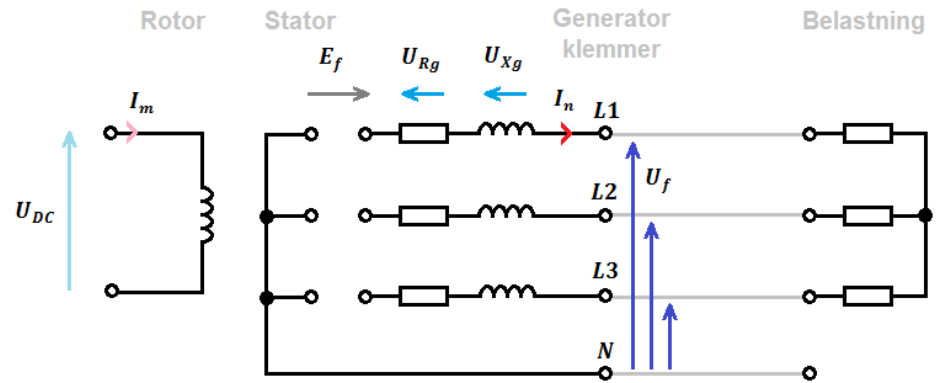


AC Frembringelse af 3 faset vekselspænding

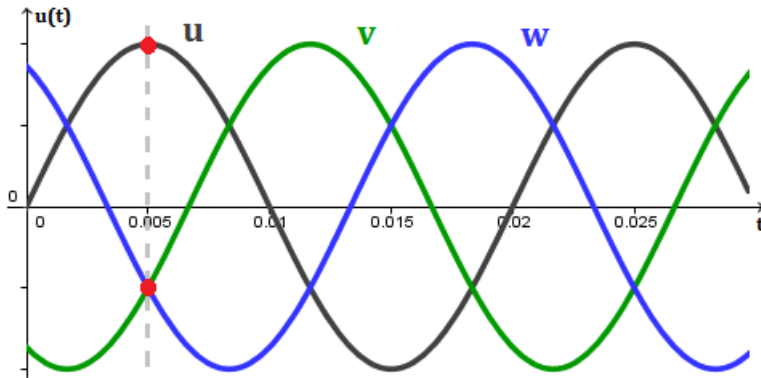
3 faset generator (princip)



Ækvivalent skema:

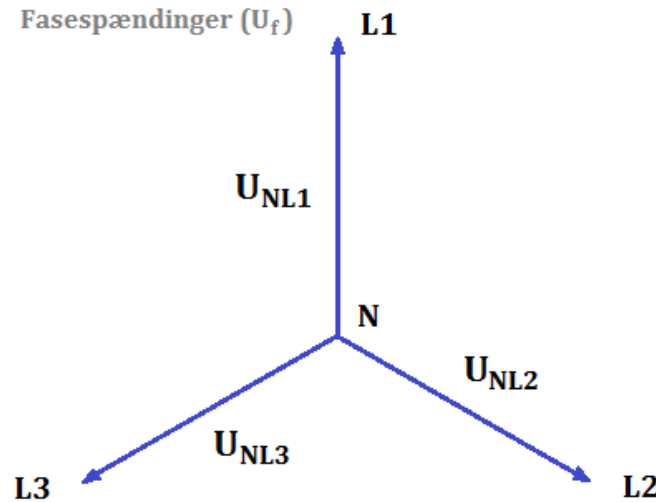


Sinuskurven:



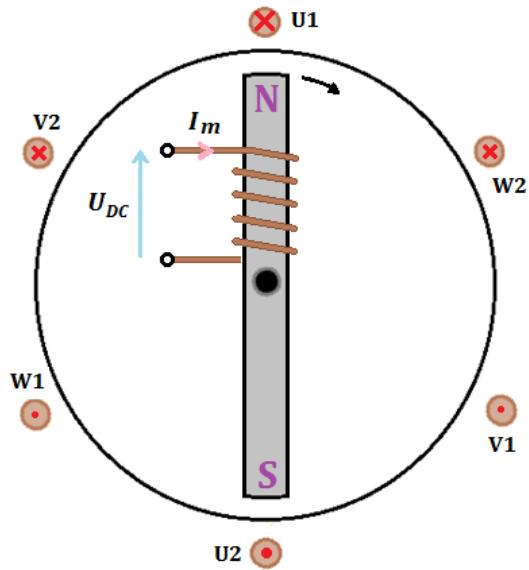
Side 9

Vektordiagram - spændinger:

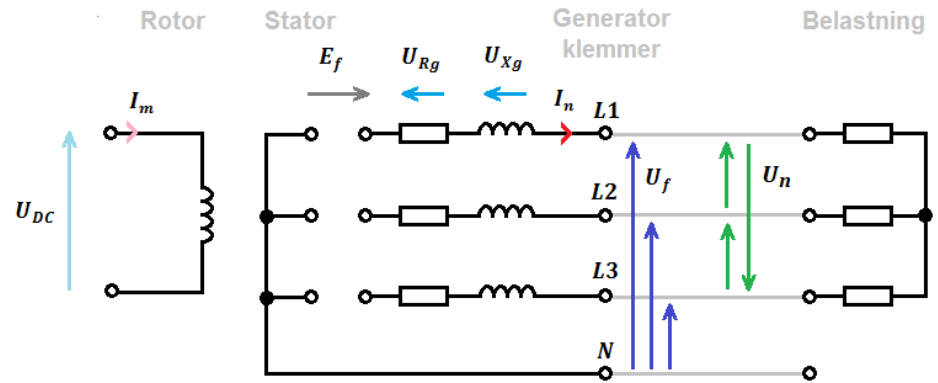


AC Frembringelse af 3 faset vekselspænding

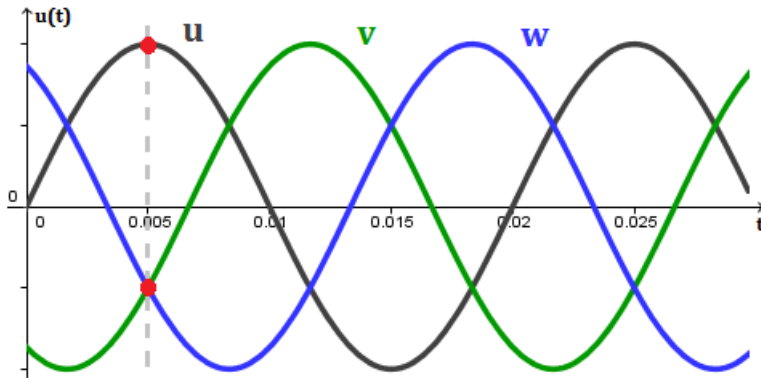
3 faset generator (princip)



Ækvivalent skema:

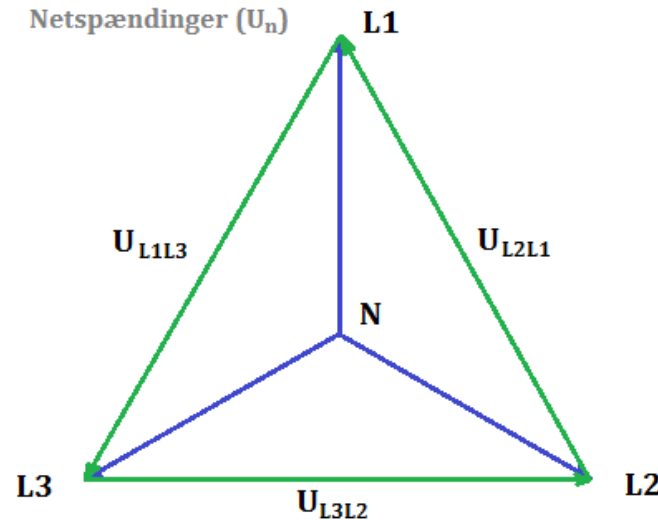


Sinuskurven:



Side 10

Vektordiagram - spændinger:

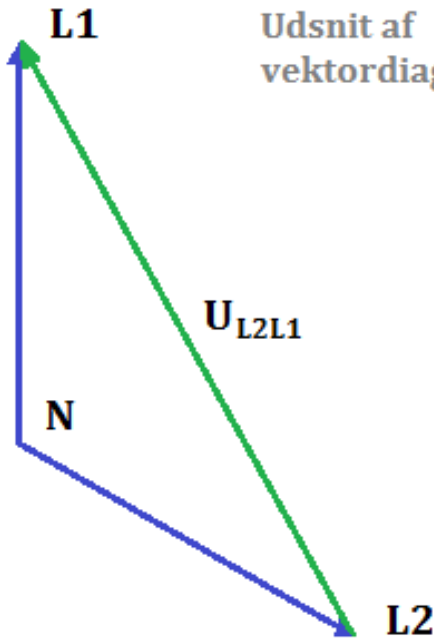


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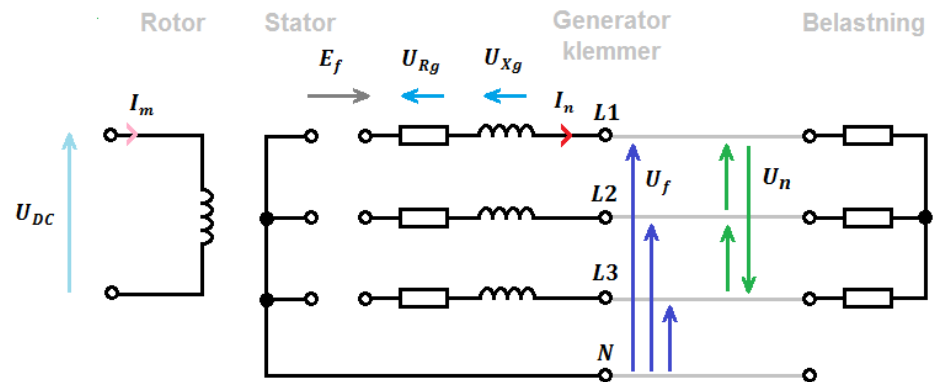
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AC Frembringelse af 3 faset vekselspænding

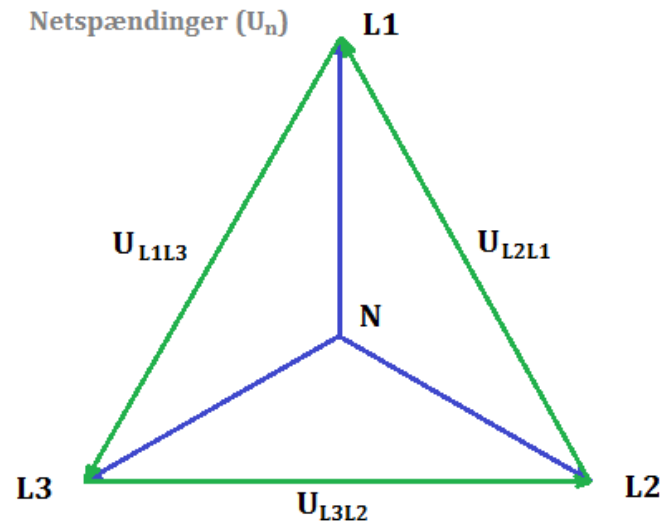
Forholdet mellem U_f og U_n :



Ækvivalent skema:

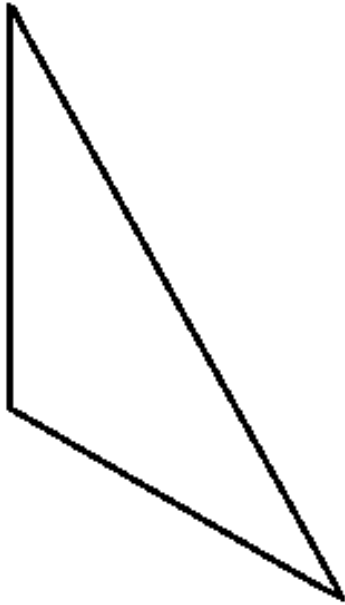


Vektordiagram - spændinger:

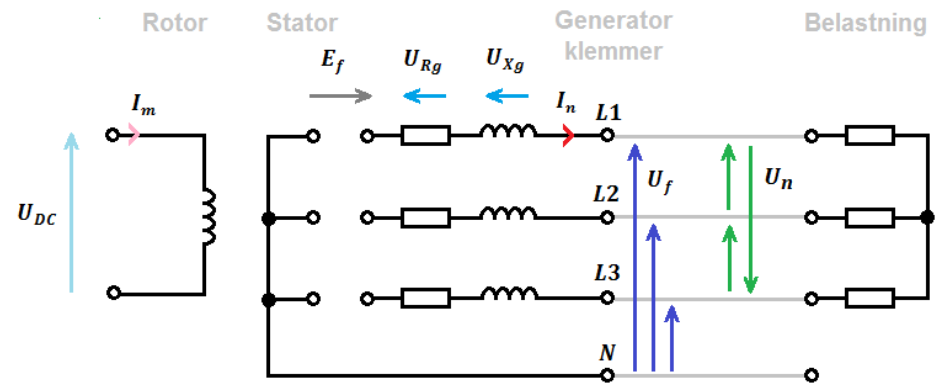


AC Frembringelse af 3 faset vekselspænding

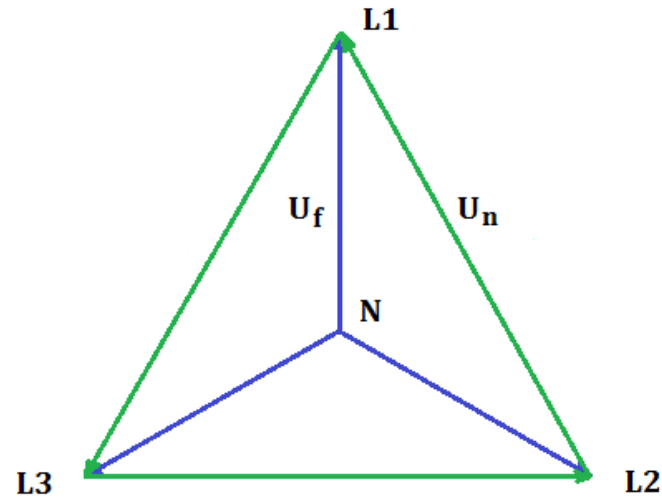
Forholdet mellem U_f og U_n :



Ækvivalent skema:

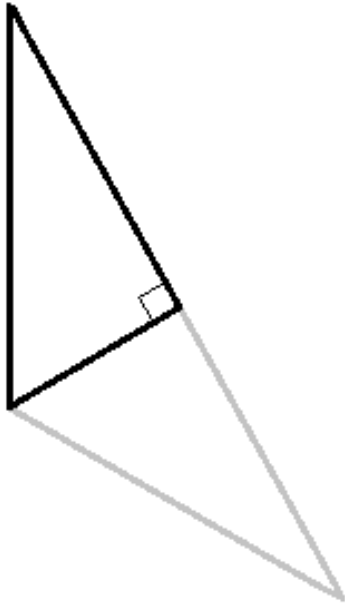


Vektordiagram - spændinger:

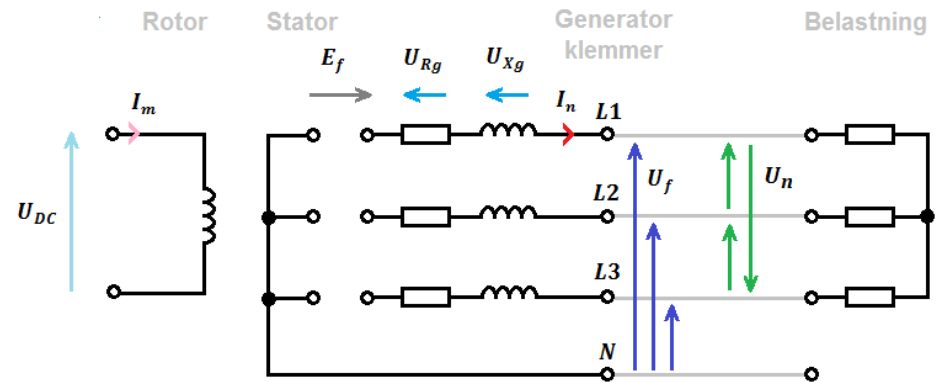


AC Frembringelse af 3 faset vekselspænding

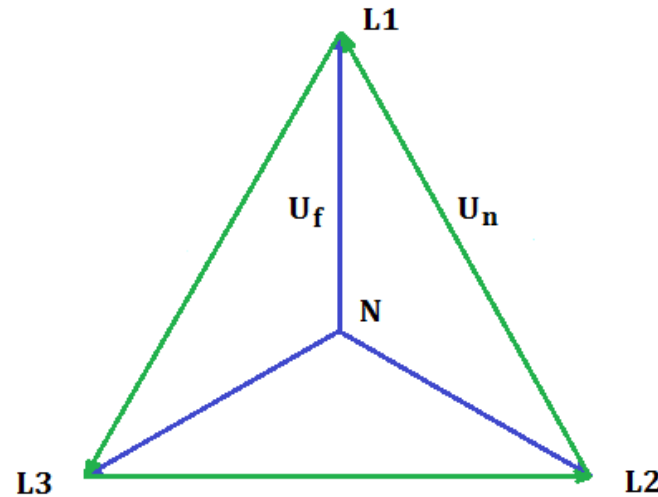
Forholdet mellem U_f og U_n :



Ækvivalent skema:

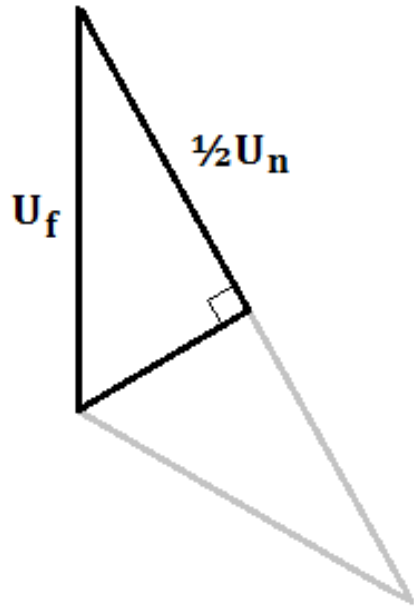


Vektordiagram - spændinger:

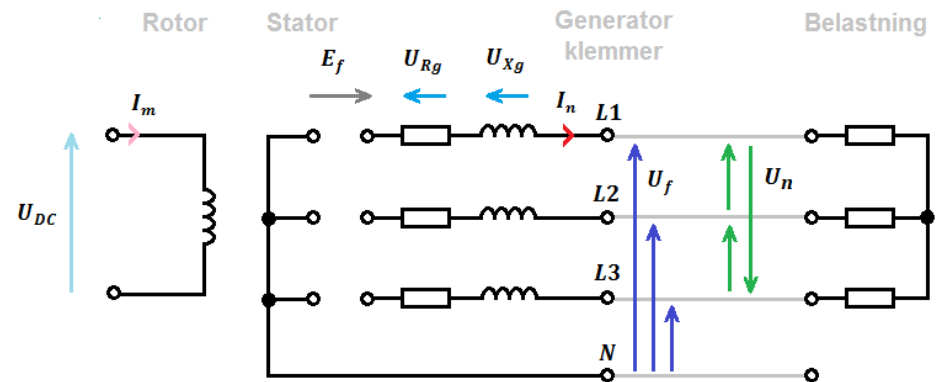


AC Frembringelse af 3 faset vekselspænding

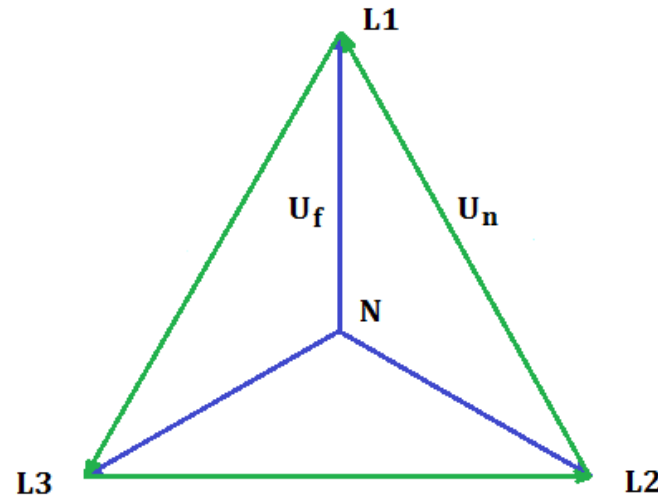
Forholdet mellem U_f og U_n :



Ækvivalent skema:

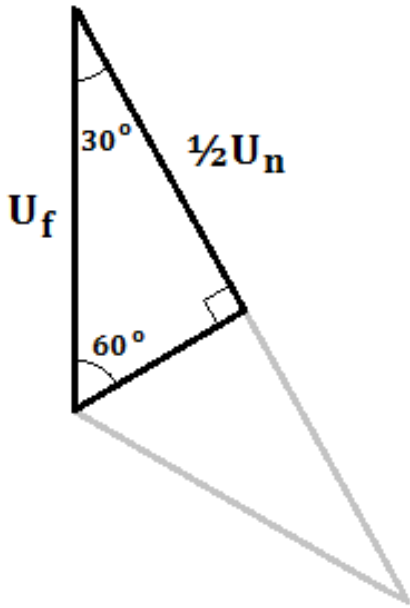


Vektordiagram - spændinger:

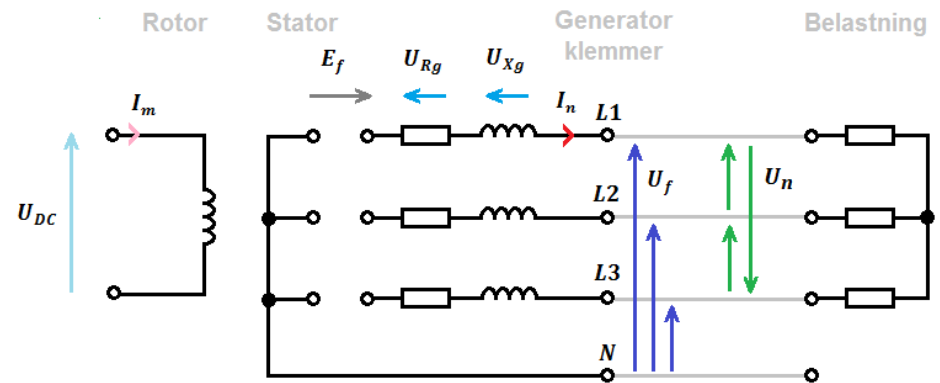


AC Frembringelse af 3 faset vekselspænding

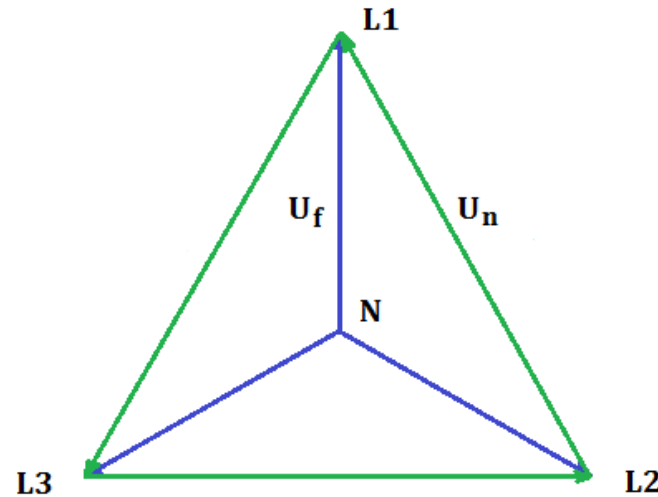
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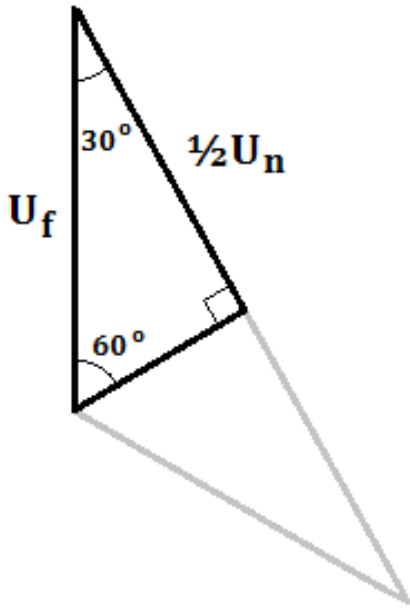


Vektordiagram - spændinger:



AC Frembringelse af 3 faset vekselspænding

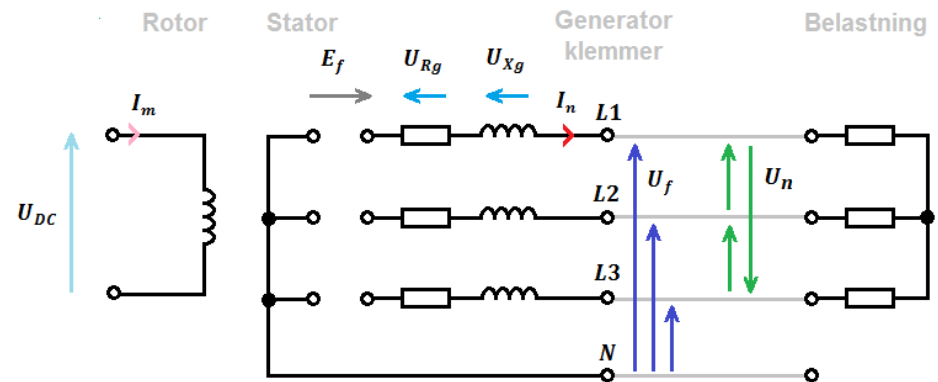
Forholdet mellem U_f og U_n :



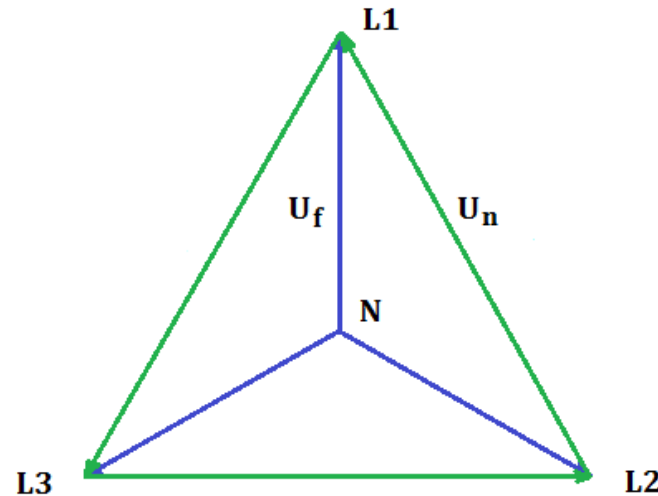
Sammenhæng:

$$\cos(30) = \frac{1/2 \cdot U_n}{U_f} \Leftrightarrow$$

Ækvivalent skema:

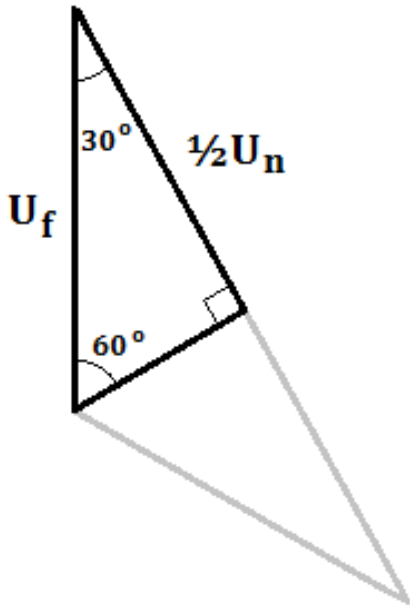


Vektordiagram - spændinger:



AC Frembringelse af 3 faset vekselspænding

Forholdet mellem U_f og U_n :

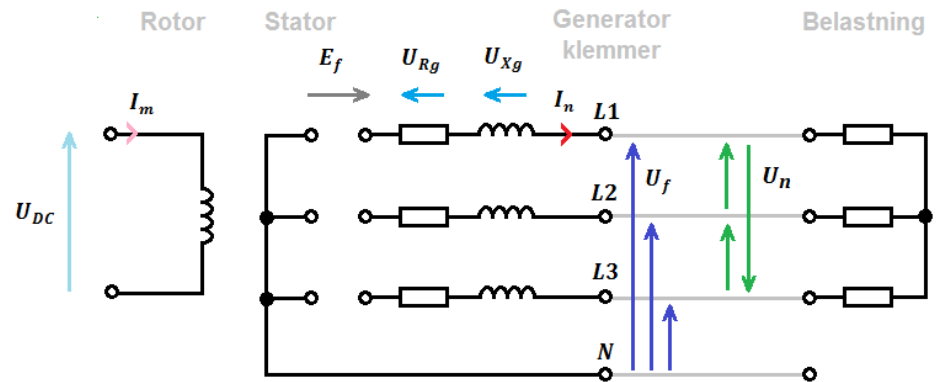


Sammenhæng:

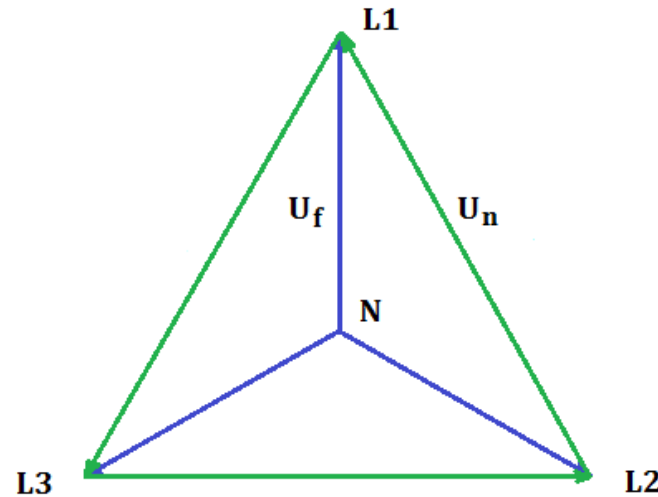
$$\cos(30) = \frac{1/2 \cdot U_n}{U_f} \Leftrightarrow$$

$$2 \cdot \cos(30) \cdot U_f = U_n \Leftrightarrow$$

Ækvivalent skema:

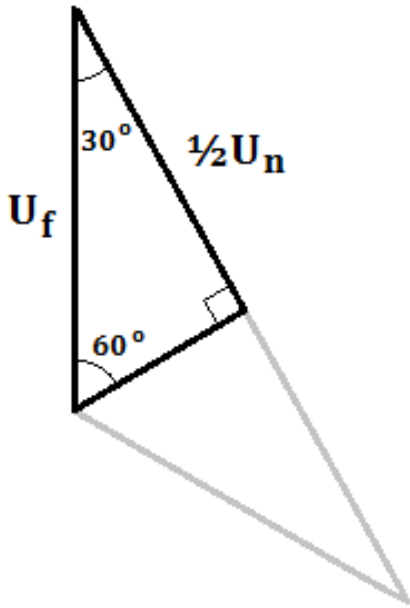


Vektordiagram - spændinger:

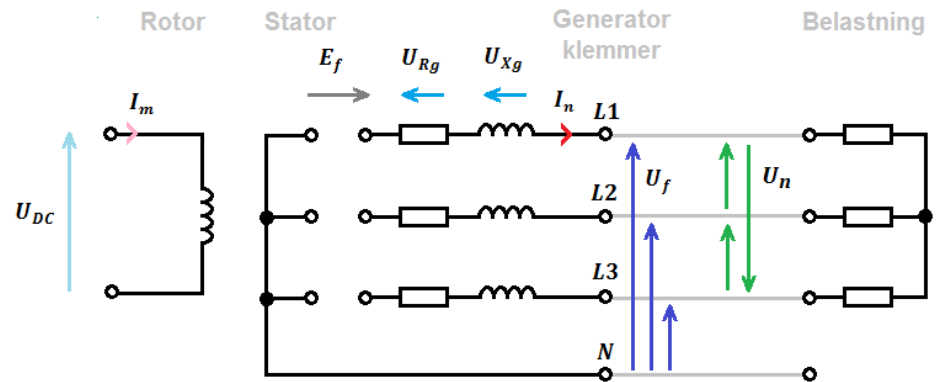


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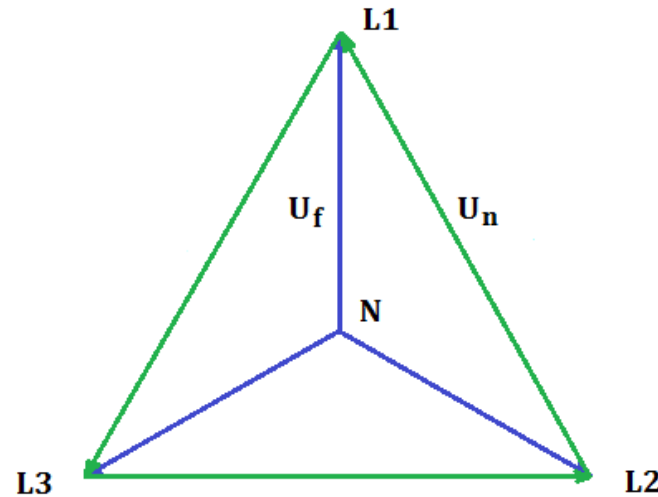
Forholdet mellem U_f og U_n :



Ækvivalent skema:



Vektordiagram - spændinger:



Sammenhæng:

$$\cos(30) = \frac{1/2 \cdot U_n}{U_f} \Leftrightarrow$$

$$2 \cdot \cos(30) \cdot U_f = U_n \Leftrightarrow \sqrt{3} \cdot U_f = U_n$$