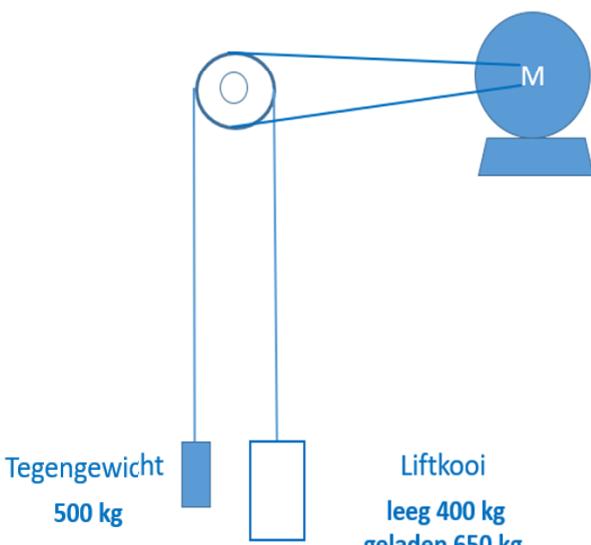


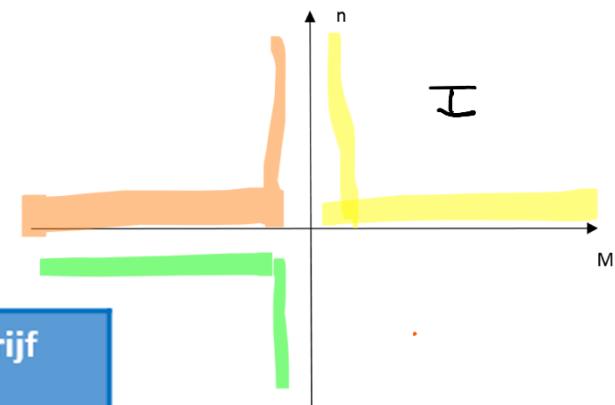
## 2.2 Aandrijfsystemen en werkingsmodes

### 2.2.4. Kwadrantenwerking – Voorbeeld 3



koppel	- toerental	kwadrant	bedrijf
	M → n →	I	Liftkooi leeg - neerwaarts
	M ← n →	II	Liftkooi vol - neerwaarts
	M ← n ←	III	Liftkooi vol - omhoog
	M → n ←	IV	Liftkooi leeg - omhoog

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omlaag ↓ n  
500 - 400

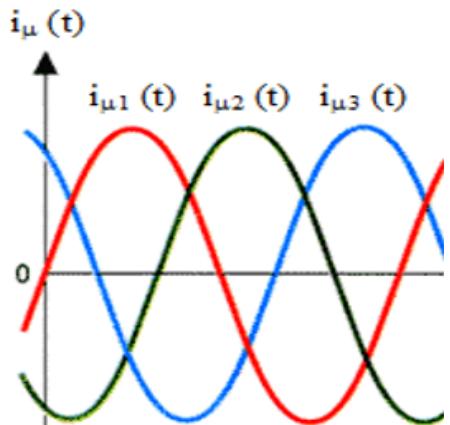
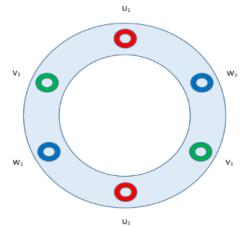
omlaag ↓ n  
500 - 650

omhoog ↑ n  
500 - 650

omhoog ↑ n  
500 - 400

## 2.3 Magnetisch draaiveld

### 2.3.1. Tweepolig draaiveld – uurwijzerzin – $\omega t = 0^\circ$



$$i_{\mu,1} =$$

$$i_{\mu,2} =$$

$$i_{\mu,3} =$$

$$\phi_1 =$$

$$\phi_2 =$$

$$\phi_3 =$$

## 2.3 Magnetisch draaiveld

### 2.3.1. Tweepolig draaiveld – uurwijzerzin – $\omega t = 0^\circ$

$$i_{\mu,1} =$$

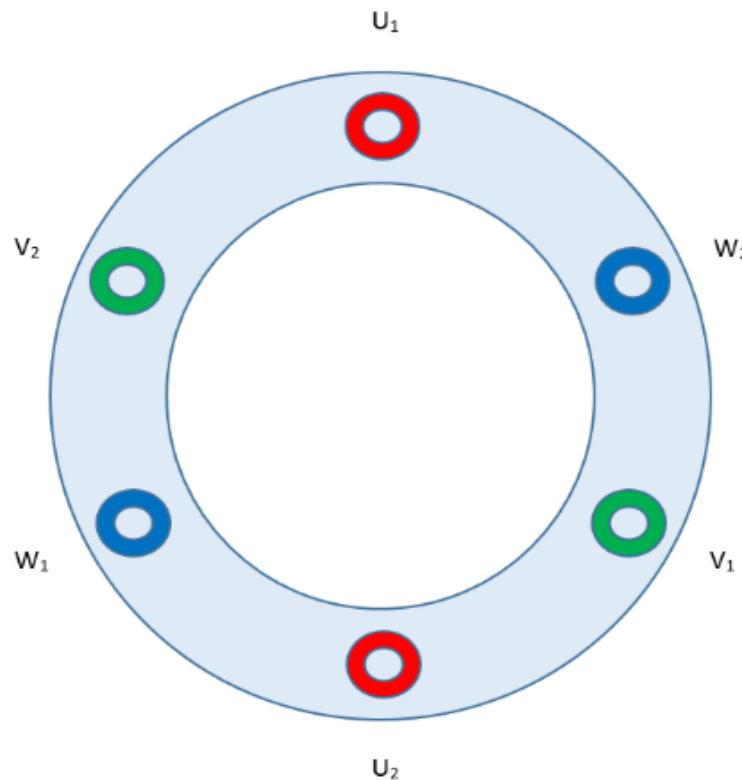
$$i_{\mu,2} =$$

$$i_{\mu,3} =$$

$$\phi_1 =$$

$$\phi_2 =$$

$$\phi_3 =$$

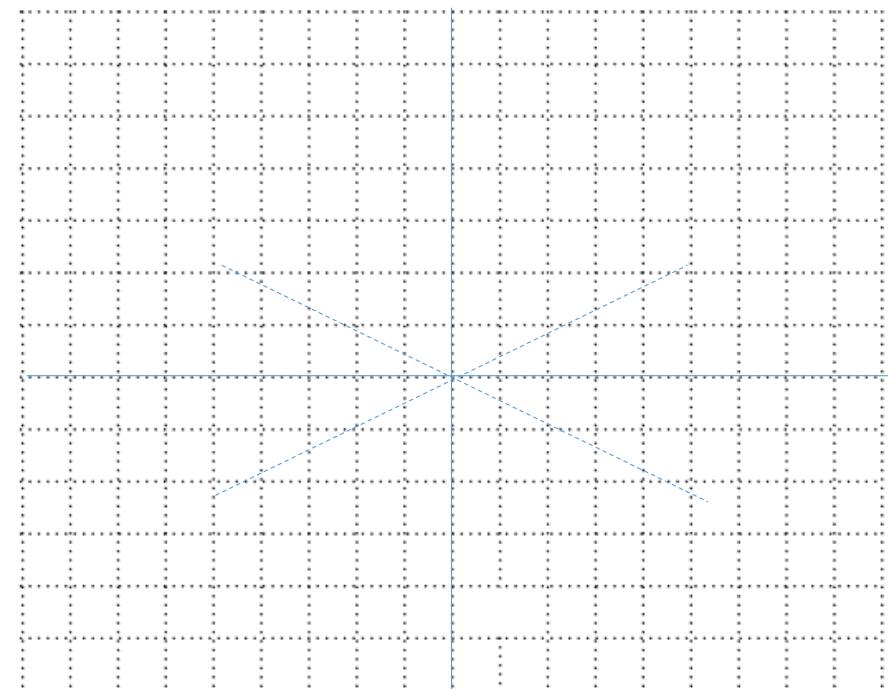
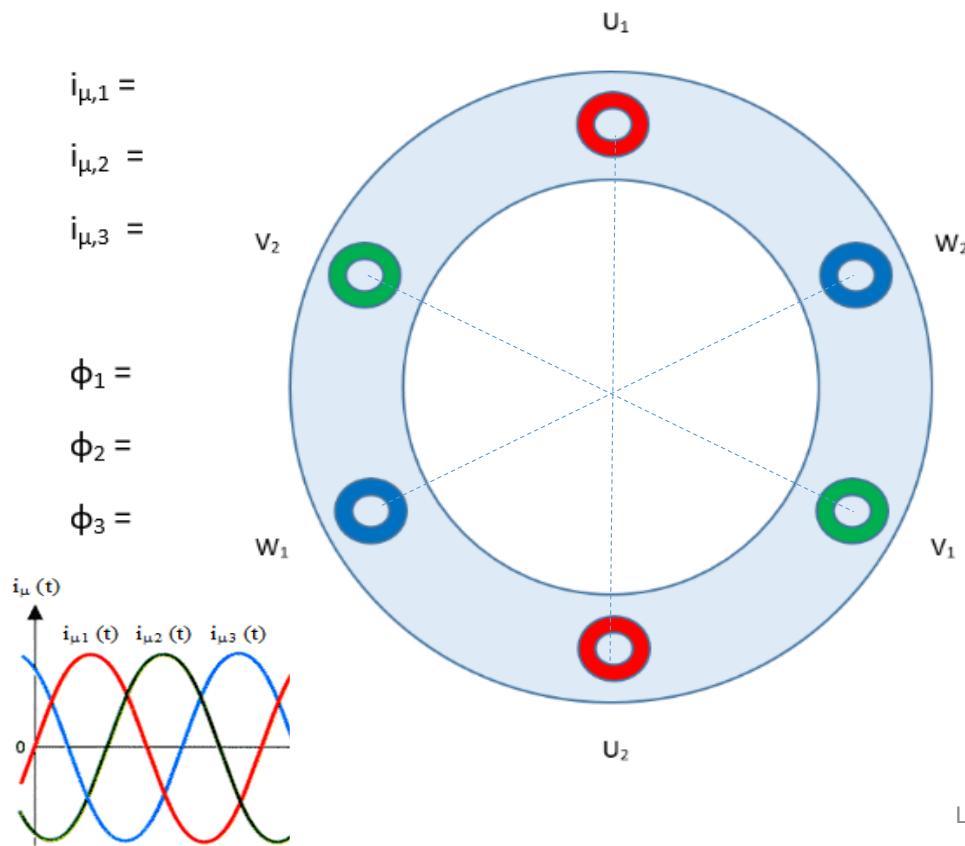


Conventie  $I > 0 \rightarrow$



## 2.3 Magnetisch draaiveld

### 2.3.1. Tweepolig draaiveld – uurwijzerzin – $\omega t = 0^\circ$

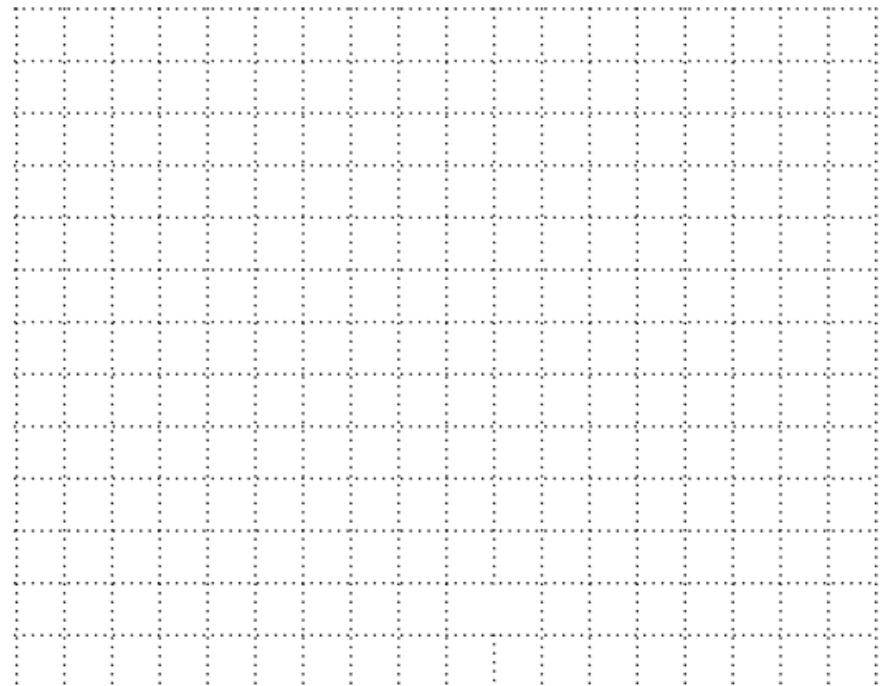
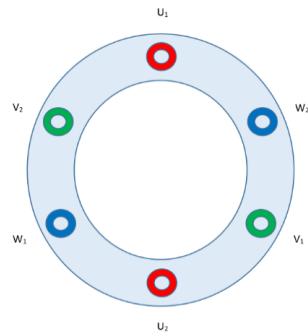


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## 2.3 Magnetisch draaiveld

### 2.3.1. Tweepolig draaiveld – uurwijzerzin – $\omega t = 0^\circ$

$$\phi_1 =$$
  
$$\phi_2 =$$
  
$$\phi_3 =$$



## 2.3 Magnetisch draaiveld

### 2.3.1. Tweepolig draaiveld – uurwijzerzin – $\omega t = 0^\circ$ – BESLUIT

$$i_{\mu,1} =$$

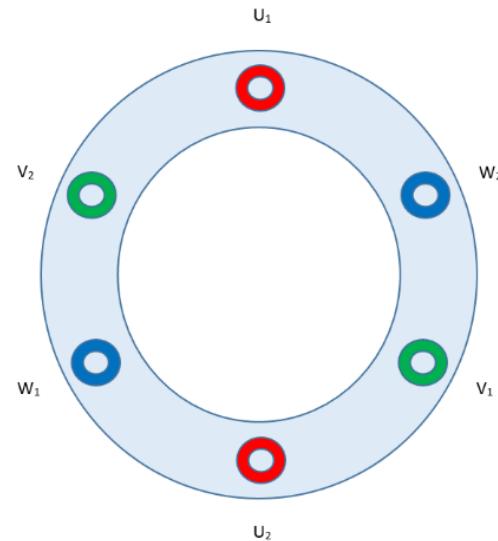
$$i_{\mu,2} =$$

$$i_{\mu,3} =$$

$$\phi_1 =$$

$$\phi_2 =$$

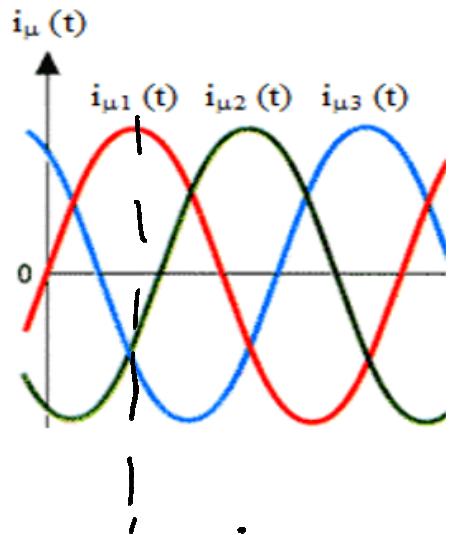
$$\phi_3 =$$



## 2.3 Magnetisch draaiveld

### 2.3.2. Tweepolig draaiveld – uurwijzerzin – $\omega t = 90^\circ$

$\omega t = 0^\circ$  } → "DRAAI," VELO  
} VELO



$$i_{\mu,1} = I_{\mu m}$$

$$i_{\mu,2} = -I_{\mu m}/2$$

$$i_{\mu,3} = -I_{\mu m}/2$$

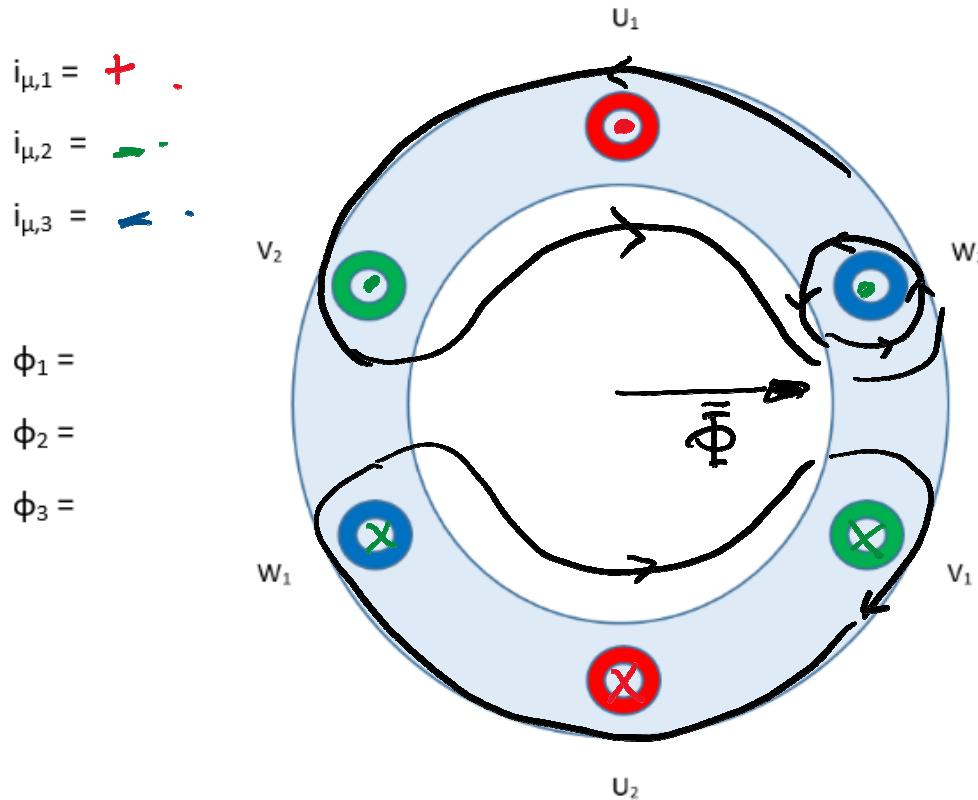
$$\phi_1 = \phi_m$$

$$\phi_2 = \phi_m/2$$

$$\phi_3 = \phi_m/2$$

## 2.3 Magnetisch draaiveld

### 2.3.2. Tweepolig draaiveld – uurwijzerzin – $\omega t = 90^\circ$

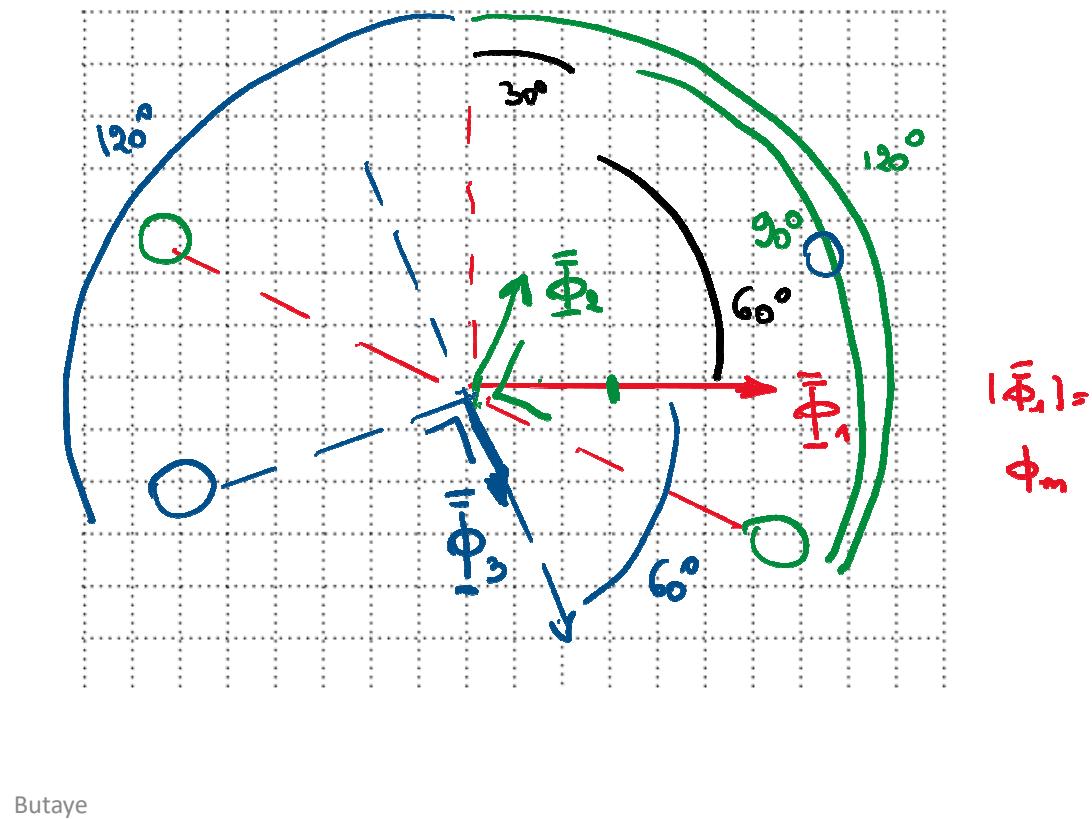
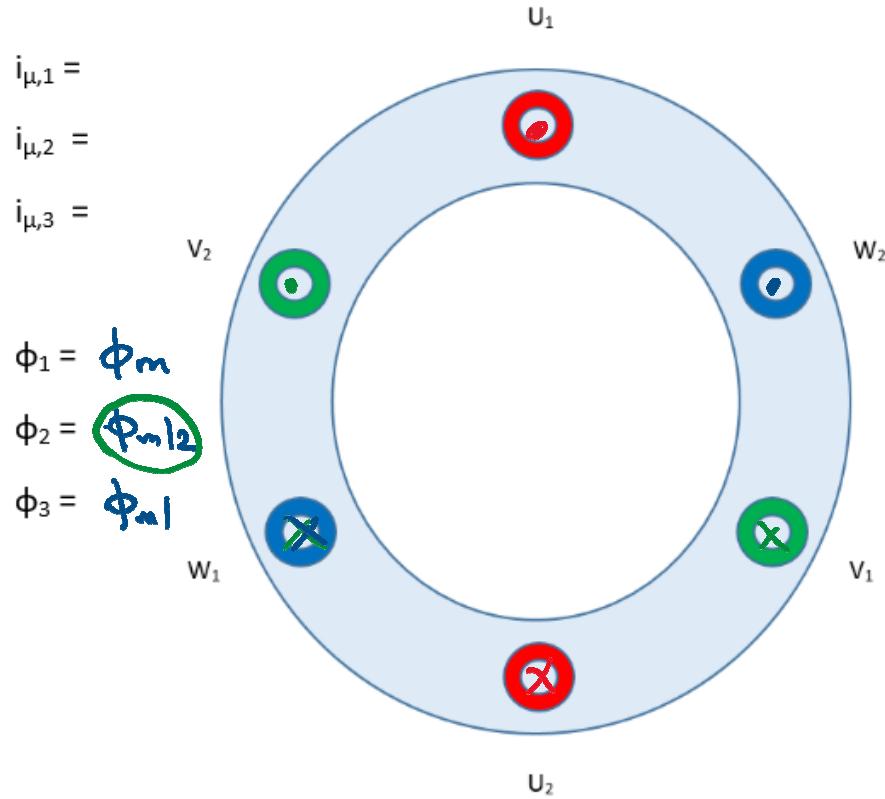


2 polig veld



## 2.3 Magnetisch draaiveld

### 2.3.2. Tweepolig draaiveld – uurwijzerzin – $\omega t = 90^\circ$



Butaye

## 2.3 Magnetisch draaiveld

### 2.3.2. Tweepolig draaiveld – uurwijzerzin – $\omega t = 90^\circ$

$$\phi_1 =$$

$$\phi_2 =$$

$$\phi_3 =$$

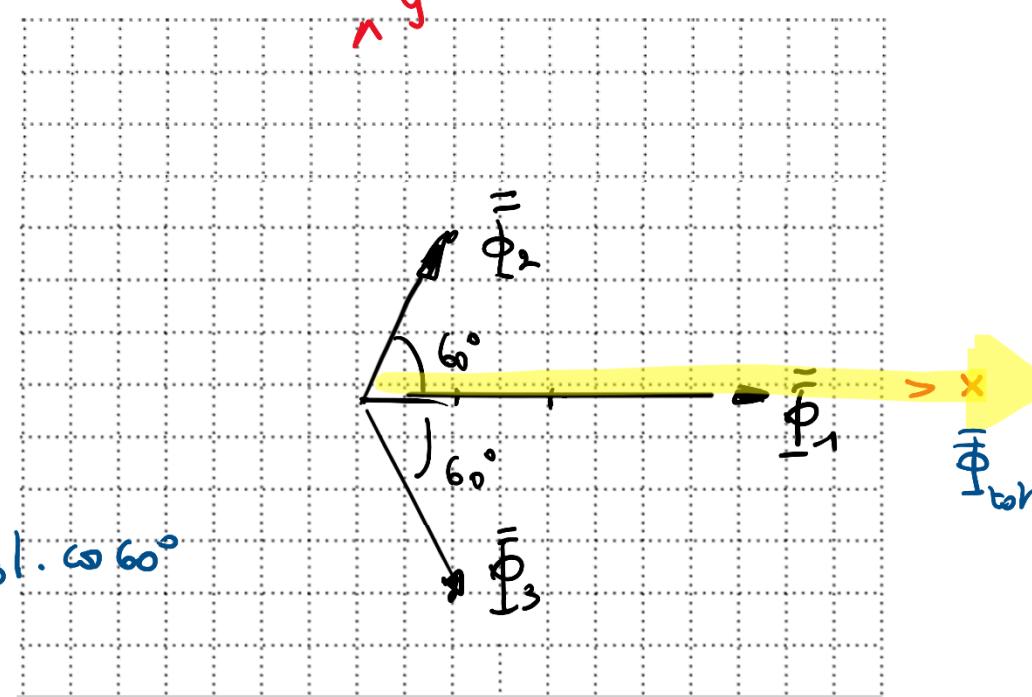
$|\bar{\Phi}_{\text{tot}}|?$  → y-comp? -

x-comp →  $A \cdot G$

$$|\bar{\Phi}_{\text{tot}}| = + |\bar{\Phi}_1| + |\bar{\Phi}_2| \cdot \cos 60^\circ + |\bar{\Phi}_3| \cdot \cos 60^\circ$$

$$= \bar{\Phi}_m + \frac{\bar{\Phi}_m}{2} \cdot \frac{1}{2} + \frac{\bar{\Phi}_m}{2} \cdot \frac{1}{2}$$

$$\equiv 1,5 \bar{\Phi}_m$$



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## 2.3 Magnetisch draaiveld

### 2.3.2. Tweepolig draaiveld – uurwijzerzin – $\omega t = 90^\circ$ – BESLUIT

$$i_{\mu,1} =$$

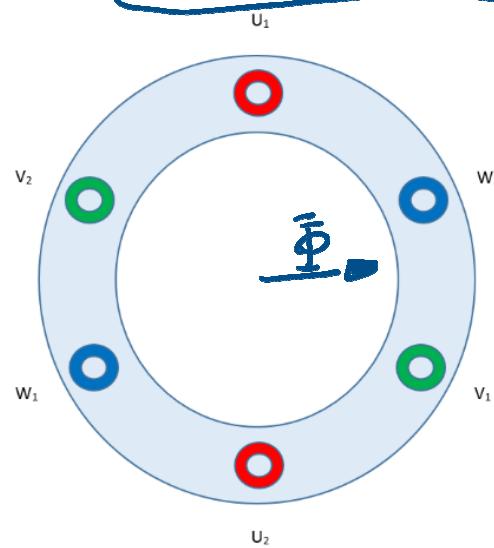
$$i_{\mu,2} =$$

$$i_{\mu,3} =$$

$$\phi_1 =$$

$$\phi_2 =$$

$$\phi_3 =$$



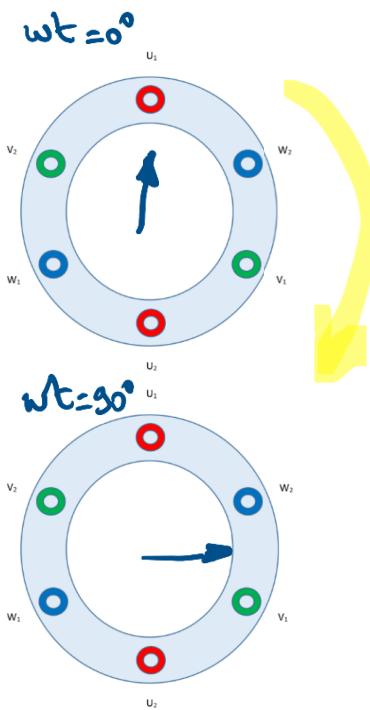
1) ligging

2) 2 polig

3)  $|\bar{\Phi}_{tot}| = 1,5 \Phi_m$

## 2.3 Magnetisch draaiveld

### 2.3.3. Tweepolig draaiveld – uurwijzerzin – $\omega t = 0^\circ$ en $90^\circ$ – BESLUIT



$\omega t = 0^\circ$

$\omega t = 90^\circ$

$\rightarrow \Phi$        $90^\circ$  verschoven  
uurwijzerzin

$$\begin{matrix} u_1 \\ 2 \\ 3 \end{matrix} \rightarrow \begin{matrix} v_1 \\ 2 \\ 3 \end{matrix} \quad 90^\circ \longrightarrow \bar{\Phi} \quad 90^\circ \text{ verschoven}$$

$$360^\circ \longrightarrow \bar{\Phi} \quad 1 \text{ toer (omw)}$$

$$f \longrightarrow f \quad \text{omw/s}$$

$f_s = "50\text{Hz}"$   
↳ freq stator

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Synchroon Toerental / Toerental Draaiveld

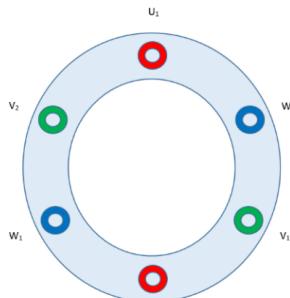
$$n_s = \frac{f_s \cdot 60}{1} \text{ omw/min}$$

3000 omw/  
min  
"MAX"

## 2.3 Magnetisch draaiveld

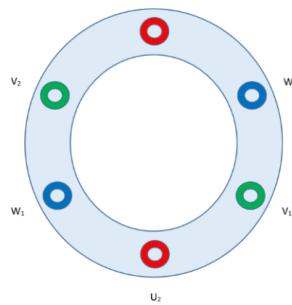
### 2.3.3. Tweepolig draaiveld – uurwijzerzin – $\omega t = 0^\circ$ en $90^\circ$ – BESLUIT

of  $180^\circ$   
 $270^\circ$



#### Draaiveld

- 2 polig
- }
- 



#### Grootte

- $1,5 \phi_m$
- CONSTANT

#### Snelheid

- $n_s = 3000 \text{ omr/min}$
- CONSTANT

{ CONSTANT VELD GROOTTE  
CONSTANT TORENTEL  $n_s$

Hoe

{ 3F SP ↗  
3F wille  
elke spoel  $120^\circ$  verduwen ----

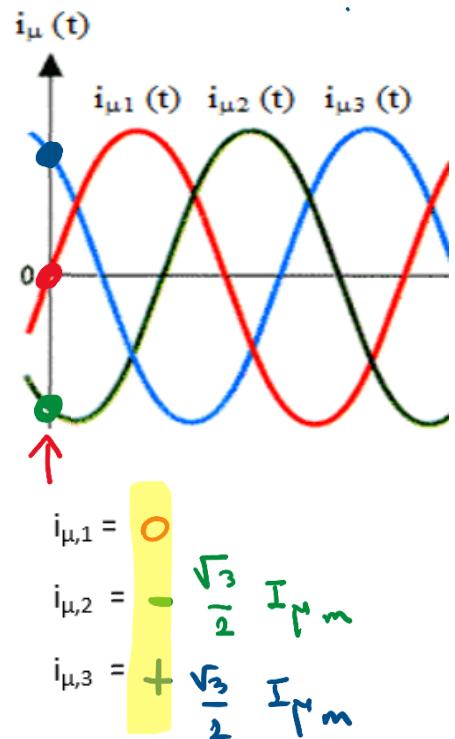
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$$n_s = \frac{60 \cdot f_s}{1}$$

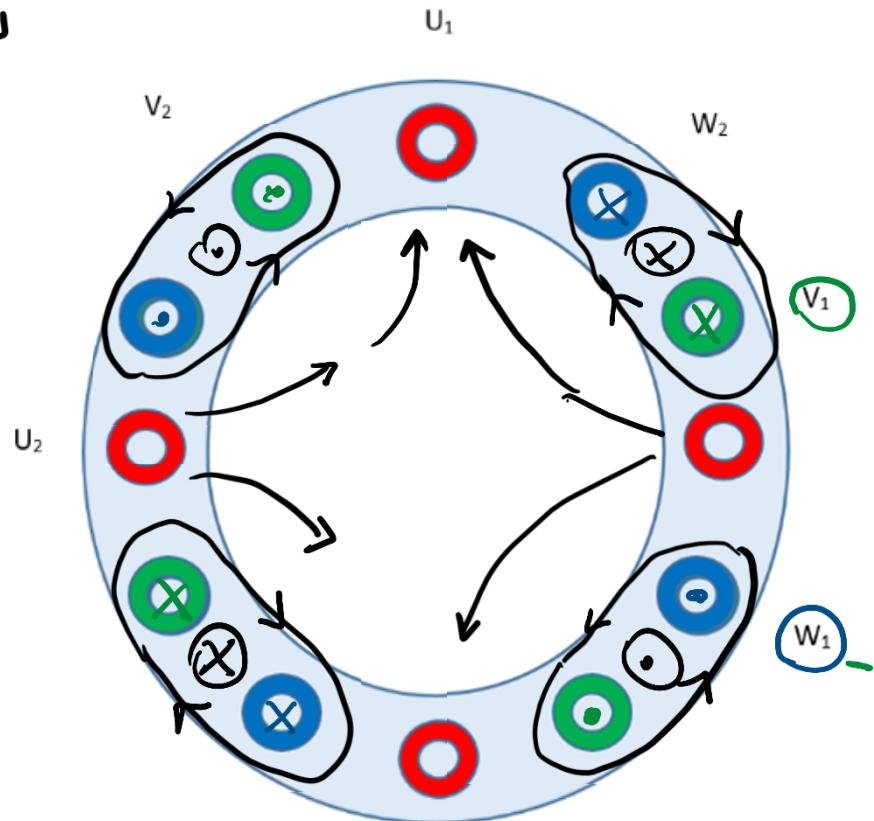
$$\tau > 0 \longrightarrow \text{circle}$$

## 2.3 Magnetisch draaiveld

### 2.3.4. Vierpolig draaiveld – uurwijzerzin – $\omega t = 0^\circ$



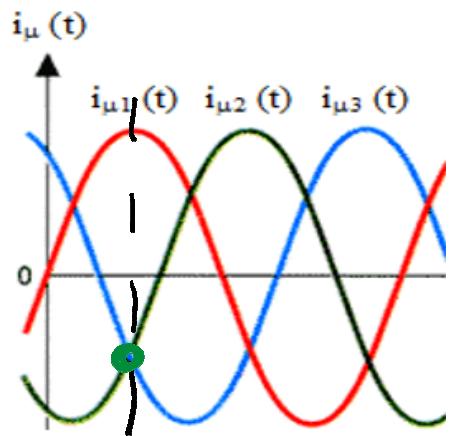
↓  
4 polig



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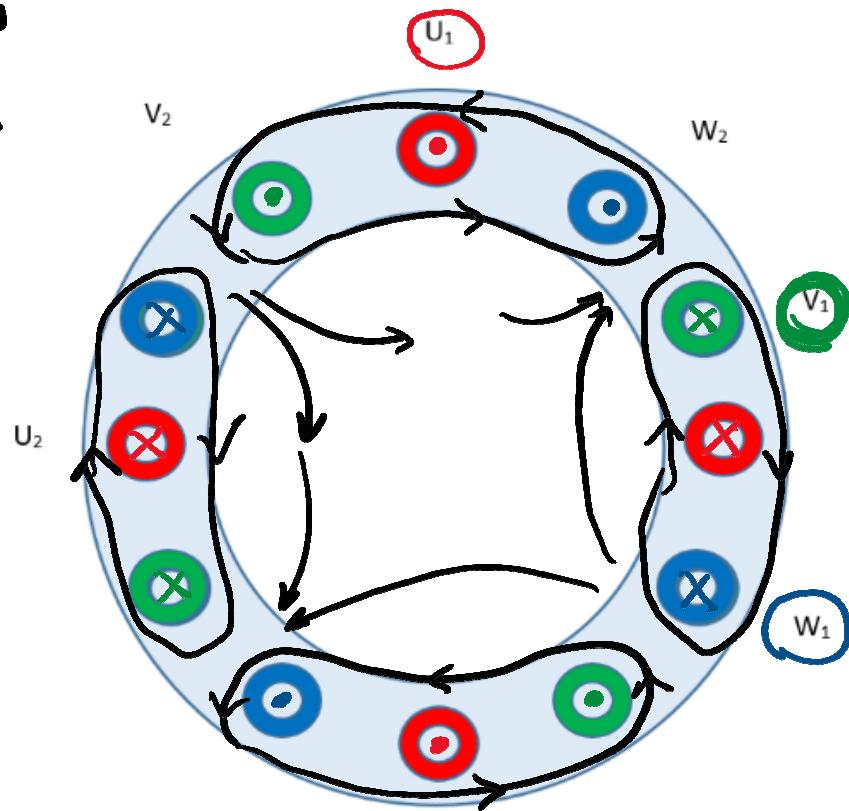
## 2.3 Magnetisch draaiveld

### 2.3.5. Vierpolig draaiveld – uurwijzerzin – $\omega t = 90^\circ$



$$\begin{aligned}i_{\mu,1} &= > \circ \\i_{\mu,2} &= < \circ - \\i_{\mu,3} &= < \circ\end{aligned}$$

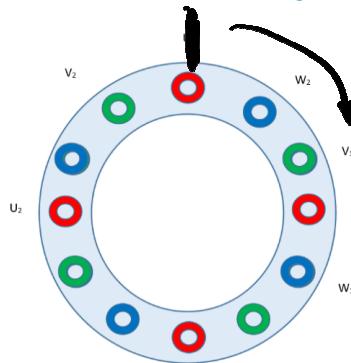
4 polig



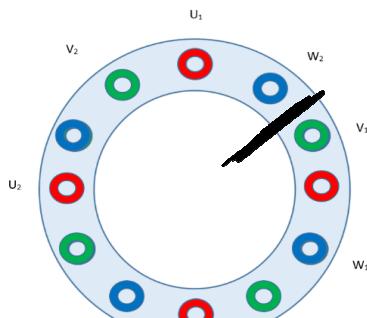
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## 2.3 Magnetisch draaiveld

### 2.3.6. Vierpolig draaiveld – uurwijzerzin – $\omega t = 0^\circ$ en $90^\circ$ – BESLUIT



- 4 polig
- uurwijzerzin
- $m_{1,2,3} \sim r_{1,2,3}$



$180^\circ$   
 $270^\circ$

$$90^\circ \longrightarrow \text{veld } 45^\circ = \frac{\text{omw}}{8}$$

$$360^\circ \longrightarrow \text{veld } 180^\circ = \frac{\text{omw}}{2}$$

$$f_s \longrightarrow \frac{f_s}{2} \quad \frac{\text{omw}}{\text{s}}$$

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$$4 \text{ polig} \quad n_s = \frac{f_s \cdot 60}{2} \quad \frac{\text{omw}}{\text{min}}$$

1500 t/m

## 2.3 Magnetisch draaiveld

### 2.3.7. Synchrone snelheid

2-polig draaiveld

$$p=1$$

$$n_s = \frac{60 \cdot f_s}{2}$$

3000 b/min

4-polig draaiveld

$$p=2$$

$$n_s = \frac{60 \cdot f_s}{4}$$

1500 t/min

Algemeen  
2p-polig draaiveld

6 polig

8 polig

$$n_s = 1000$$

$$750$$

$$n_s = \frac{60 \cdot f_s}{p}$$

→ 3000

10 polig

12 polig

$$600$$

$$500$$

$$tpm$$

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## 2.3 Magnetisch draaiveld

### 2.3.8. Tweepolig draaiveld – tegenwijzerzin – $\omega t = 0^\circ$

$$i_{\mu,1} =$$

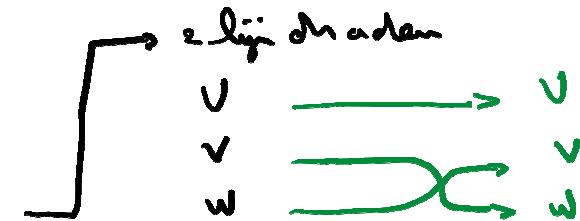
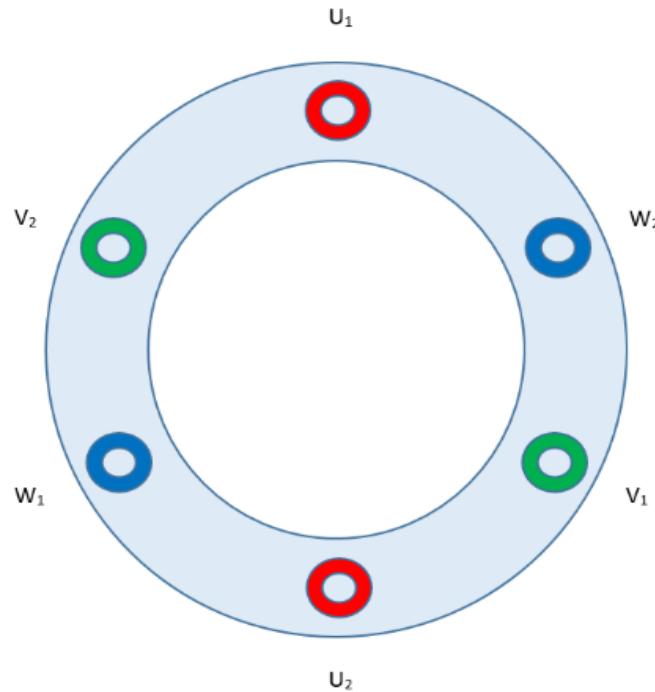
$$i_{\mu,2} =$$

$$i_{\mu,3} =$$

$$\phi_1 =$$

$$\phi_2 =$$

$$\phi_3 =$$



## 2.3 Magnetisch draaiveld

### 2.3.9. Tweepolig draaiveld – tegenwijzerzin – $\omega t = 90^\circ$

$$i_{\mu,1} =$$

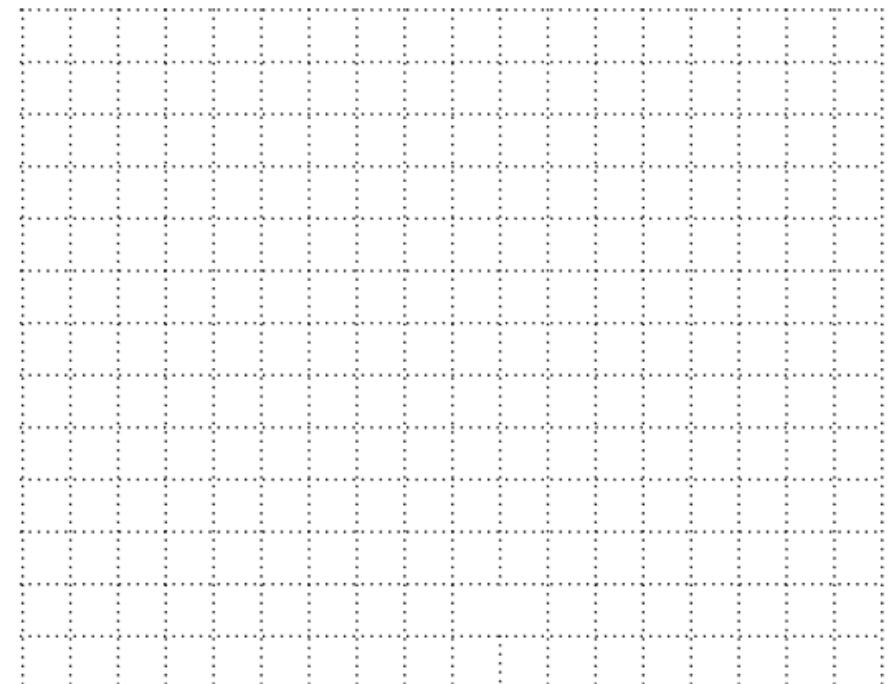
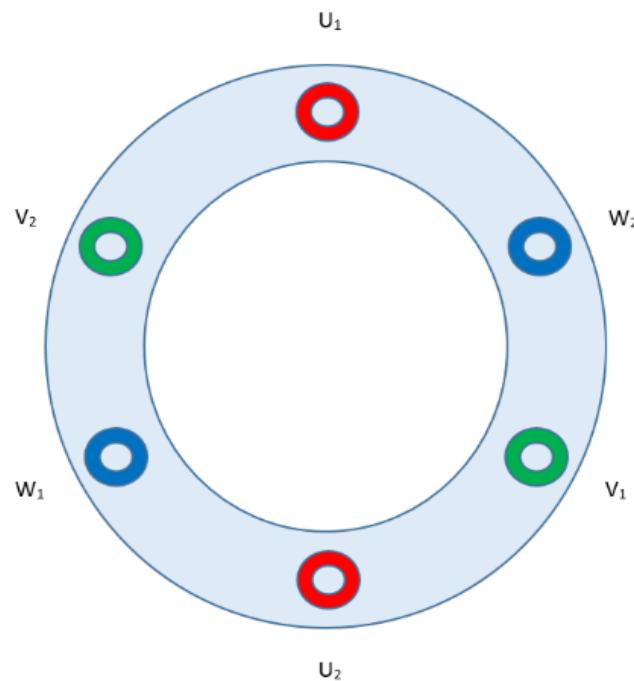
$$i_{\mu,2} =$$

$$i_{\mu,3} =$$

$$\phi_1 =$$

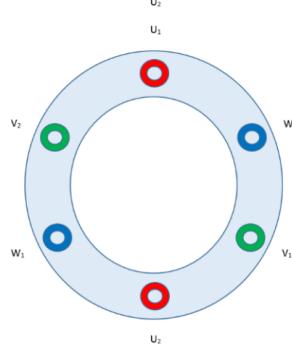
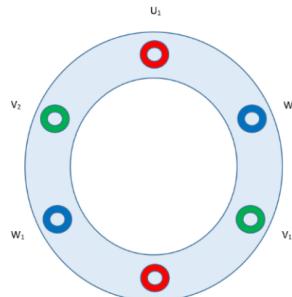
$$\phi_2 =$$

$$\phi_3 =$$



## 2.3 Magnetisch draaiveld

### 2.3.10. Tweepolig draaiveld – tegenwijzerzin – $\omega t = 0^\circ$ en $90^\circ$ – BESLUIT



## 2.4 Het asynchroon ideaal motorprincipe

### 2.4.1. Algemeen

Transformator	ASM	Toek.
PRIMAIRE 1	STATOR	VELD
SECUND 2	ROTOR	$I_2 \leftarrow E_2 \leftarrow B^{ln}_{rad}$
-	LUCHTSPLEET	OPM $I_{p_T} < I_{p_Asm}$
SINVS. WISSELVELD	DRAAIVELD	VELD