EE-2001 PROJECT

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ABOUT

To generate waveform of emf across winding using flux density space variation

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Important formuale use to make graph

Stepped distribution:Full pitch coil

Fourier coefficient

Hence, the resultant amplitude of the rth harmonic is the sum of the terms listed above. This sum is given by*

$$A_r = \frac{4}{\pi}\frac{A}{qr}[1 + \cos r\gamma + \cos 2r\gamma + \cdots + \cos (q-1)r\gamma]$$

$$= \frac{4}{\pi}\frac{A}{r}\frac{\sin (qr\gamma/2)\cos [(q-1)r\gamma/2]}{q \sin (r\gamma/2)} \qquad (4\text{-}47)$$

Stepped distribution:fractional pitch coil

Fourier coefficient

$$A_r = \frac{4}{\pi}\frac{A}{qr}\frac{\sin(qr\gamma/2)}{\sin(r\gamma/2)}\left[\cos re\cos\frac{(q-1)r\gamma}{2} - \sin re\sin\frac{(q-1)r\gamma}{2}\right]$$

$$= \frac{4}{\pi}\frac{A}{r}\frac{\sin(qr\gamma/2)}{q\sin(r\gamma/2)}\cos r\left[\epsilon + \frac{(q-1)\gamma}{2}\right] \qquad (4\text{-}51)$$

uniform distribution:Full pitch coil

Fourier coefficient

$$A_r = \frac{4}{\pi}\frac{A}{r}\frac{\sin\,(r\beta/2)\,\cos\,(r\beta/2)}{r\beta/2} = \frac{4}{\pi}\frac{A}{\beta r^2}\sin\,r\beta$$

note : here B=60 degree as we habe

assume narrow winding phase

uniform distribution:fractional pitch coil

Fourier coefficient

$$A_r = \frac{4}{\pi}\frac{A}{r}\frac{\sin\frac{r\beta}{2}\cos r\left(\epsilon+\frac{\beta}{2}\right)}{r\beta/2} = \frac{8}{\pi}\frac{A}{\beta r^2}\sin\frac{r\beta}{2}\cos r\left(\epsilon+\frac{\beta}{2}\right)$$

triangular distribution:full pitch coil

Fourier coefficient

$$A_r = \frac{8}{\pi^2}\frac{A}{r^2}\sin\frac{r\pi}{2} = -(-1)^{(r+1)/2}\frac{8}{\pi^2}\frac{A}{r^2}$$

triangular distribution:fractional pitch coil

Fourier coefficient

$$A_r = \frac{8}{\pi}\frac{A}{\beta r^2}\sin r\left(\frac{\pi}{4}-\frac{e}{2}\right)\cos r\left(\frac{\pi}{4}+\frac{e}{2}\right)$$