



انجمن مهندسين برق و الكترونيك ايران  
شاخه ي تهران



دانشگاه صنعتي اميركبير  
قطب علمي قدرت

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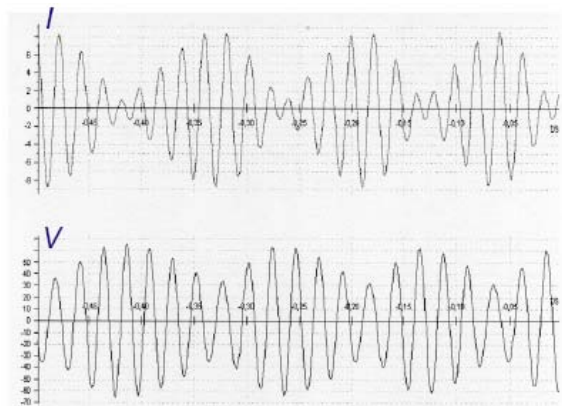
the 1st Power System Protection & Control conference  
اولين كنفرانس تخصصي PSPC  
29 و 30 آذر 85  
حفاظت و كنترل سيستمهاي قدرت



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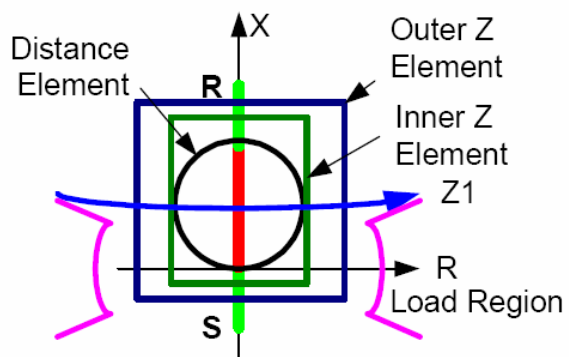


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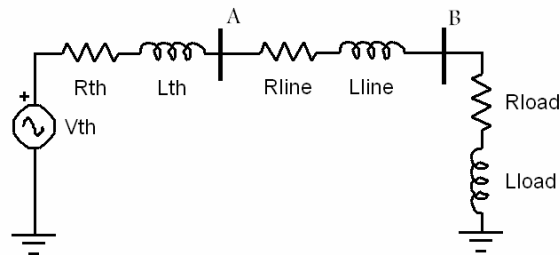
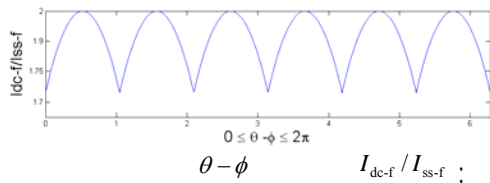
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B A

A



$\theta - \phi$

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a

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b

$I_{dc-f}$

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a

$\theta$

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$$R = R_{th} + R_{line}$$

$$L = L_{th} + L_{line}$$

$$V = V_{th}$$

$$\phi = \tan^{-1}(L\omega/R)$$

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$$I_{dc-f-a} = I_{ss-f} \sin(\theta - \phi)$$

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$\theta - \phi$

$|I_{dc-f-a}|$

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( $I_{ss-f}$ )

$$I_f(t) = k_1 e^{-t/\tau} + k_2 \sin(\omega t + \theta_1) + k_3 \sin(3\omega t + \theta_2) \quad ( )$$

$$e^{-t/\tau} = 1 - \frac{t}{\tau} + \frac{1}{2!} \frac{t^2}{\tau^2} - \frac{1}{3!} \frac{t^3}{\tau^3} + \dots \quad ( )$$

$$I_f(t) = k_1 - k_1 \frac{t}{\tau} + k_1 \frac{t^2}{2\tau^2} - k_1 \frac{t^3}{6\tau^3} + k_2 \sin(\omega t + \theta_1) + k_3 \sin(3\omega t + \theta_2) \quad ( )$$

$$I_f(t) = k_1 - k_1 \frac{t}{\tau} + k_1 \frac{t^2}{2\tau^2} - k_1 \frac{t^3}{6\tau^3} + k_2 \cos \theta_1 \sin \omega t + k_2 \sin \theta_1 \cos \omega t + k_3 \cos \theta_2 \sin 3\omega t + k_3 \sin \theta_2 \cos 3\omega t \quad ( )$$

$I_{dc-f}$   
( )

$$I_{dc-f} = |I_{dc-f-a}| + |I_{dc-f-b}| + |I_{dc-f-c}| \quad ( )$$

$$= I_{ss-f} \cdot [|\sin(\theta - \phi)| + |\sin(\theta - 120 - \phi)| + |\sin(\theta + 120 - \phi)|]$$

$\theta - \phi$

$I_{dc-f} / I_{ss-f}$

$I_{dc-f}$

$$t = t_1, t_2, \dots, t_m \quad \& \quad m \geq 8$$

$$\forall i = 1, 2, \dots, m$$

$$I_f(t_i) = k_1 - k_1 \frac{t_i}{\tau} + k_1 \frac{t_i^2}{2\tau^2} - k_1 \frac{t_i^3}{6\tau^3} + k_2 \cos \theta_1 \sin \omega t_i + k_2 \sin \theta_1 \cos \omega t_i + k_3 \cos \theta_2 \sin 3\omega t_i + k_3 \sin \theta_2 \cos 3\omega t_i \quad (1)$$

dc

$$I_f(t_i) = a_{i,1} \cdot x_1 + a_{i,2} \cdot x_2 + a_{i,3} \cdot x_3 + \dots + a_{i,8} \cdot x_8 \quad (2)$$

Not

And

$$a_{i,1} = 1, a_{i,2} = \sin \omega t_i, a_{i,3} = \cos \omega t_i, a_{i,4} = \sin 3\omega t_i$$

$$a_{i,5} = \cos 3\omega t_i, a_{i,6} = t_i, a_{i,7} = t_i^2, a_{i,8} = t_i^3$$

$$x_1 = k_1, x_2 = k_2 \cos \theta_1, x_3 = k_2 \sin \theta_1, x_4 = k_3 \cos \theta_2$$

$$x_5 = k_3 \sin \theta_2, x_6 = -k_1/\tau, x_7 = k_1/(2\tau^2), x_8 = -k_1/(6\tau^3)$$

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$$\begin{bmatrix} I_f(t_1) \\ I_f(t_2) \\ \vdots \\ I_f(t_m) \end{bmatrix} = \begin{bmatrix} a_{1,1} & a_{1,2} & \dots & a_{1,8} \\ a_{2,1} & a_{2,2} & \dots & a_{2,8} \\ \vdots & \vdots & \vdots & \vdots \\ a_{m,1} & a_{m,2} & \dots & a_{m,8} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_8 \end{bmatrix} \quad (3)$$

$$I_f(t)_{m \times 1} = A_{m \times 8} X_{8 \times 1} \quad (4)$$

$$X = [A^T A]^{-1} [A^T] I_f(t)$$

$$I_{dc-f-a} = x_1 \quad (5)$$

MATLAB

$$I_{dc-f-c} \quad I_{dc-f-b}$$

C B

$$I_{dc-f} = |I_{dc-f-a}| + |I_{dc-f-b}| + |I_{dc-f-c}| \quad (6)$$

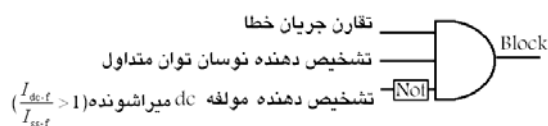
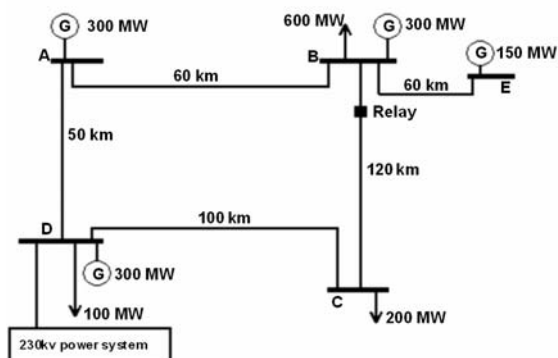
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$I_{dc-f}$



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the 1st Power System Protection & Control conference  
Dec 20, 21th 2006  
اولين كنفرانس تخصصي حفاظت و كنترل سيستمهاي قدرت  
۲۹ و ۳۰ آذر ۸۵



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قطب علمی قدرت

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$I_{dc-f}$

$I_{dc-f}$

And

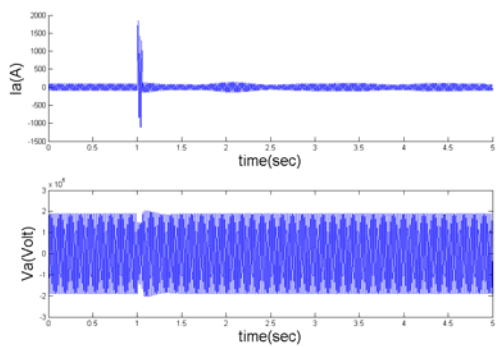
$I_{dc-f}$

$I_{dc-f}$

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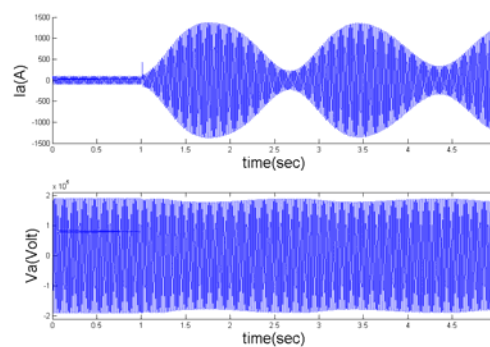
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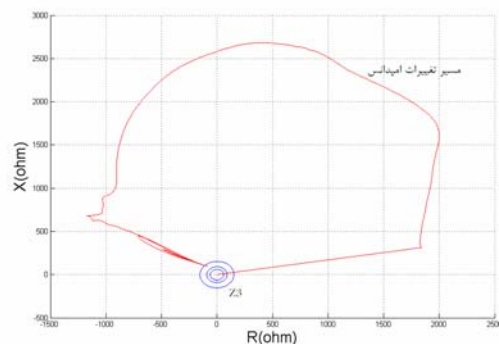
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