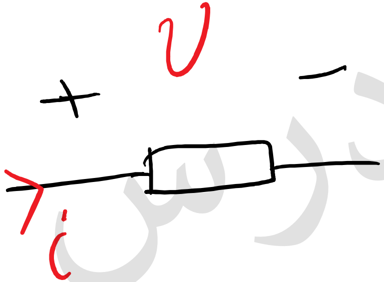
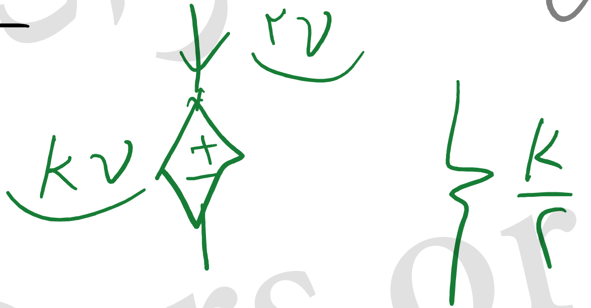
جلسه ۰۱

متغیرهای شبکه

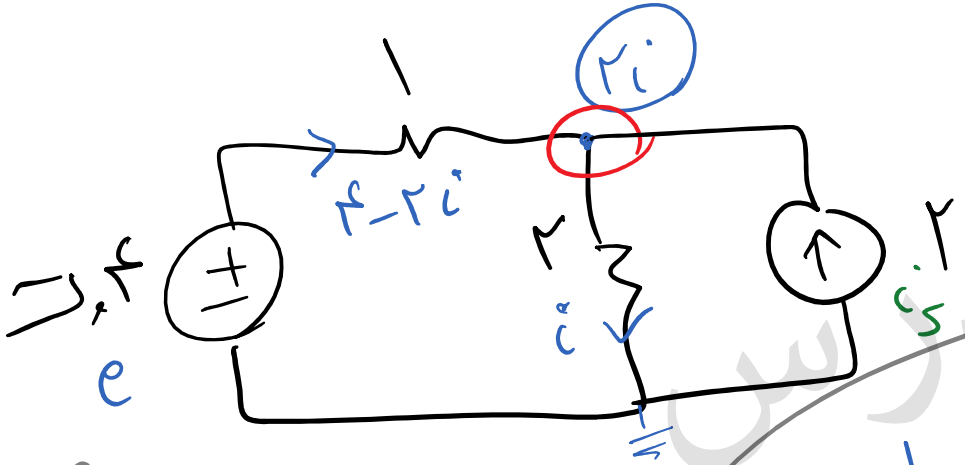
$R = \frac{v}{i}$



۱- توجانشین:



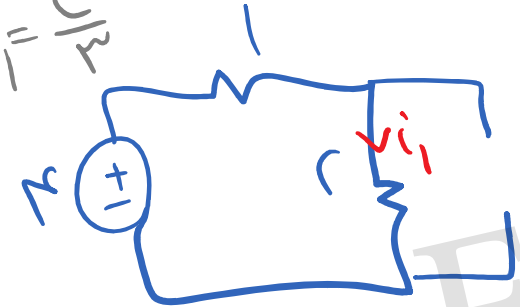
فرادرس
FaraDars.org



$۴-۲i+۲=i$

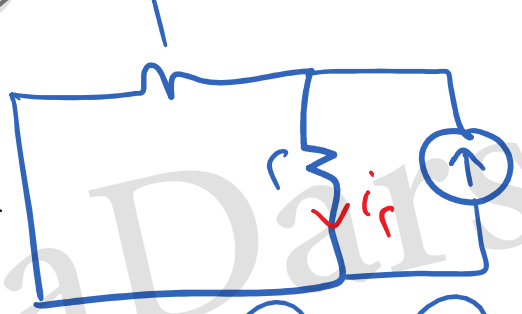
$i=۲$

$i_1=\frac{e}{۲}$



$i_1=\frac{۴}{۲}$

$۲\times(\frac{۴}{۲})^{۲}$



$۲i_2=\frac{۴}{۲}$

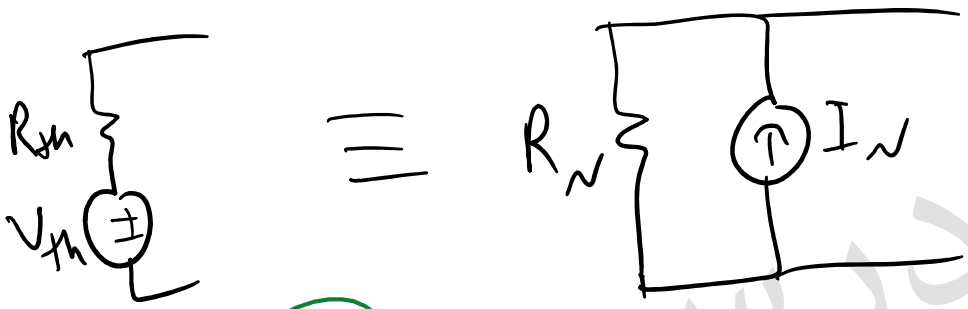
$۲\times(\frac{۲}{۲})^{۲}$

$i=\alpha i_s+\beta e_s$

$i_2=\frac{۱}{۲}i_s$

$a^{۲}+b^{۲}\neq(a+b)^{۲}$

فرادرس
FaraDars.org



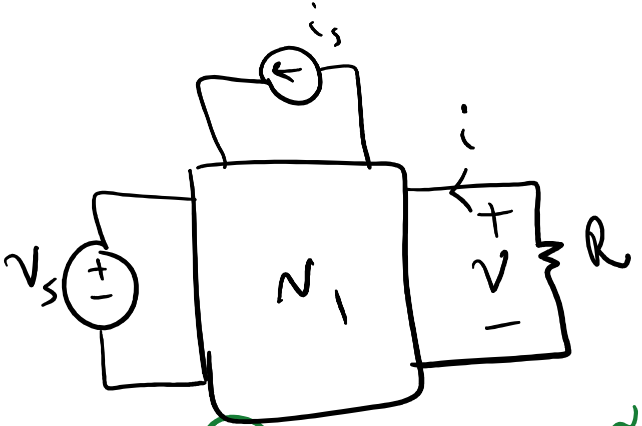
$$R_{th} = R_N$$

$$V_{th} = R_{th} I_N$$

تونن و نورتن:

$$V_{th} = \alpha e_s + \beta i_s + \lambda e_{s2}$$

فرادرس
FaraDars.org



$i_s = 2,\ v_s = 2\cos t \Rightarrow 2v - 3i - 1 + 3\cos t = 0$

$i_s = 2\cos t,\ v_s = 2 \Rightarrow$ توان ماکزیمم R ؟

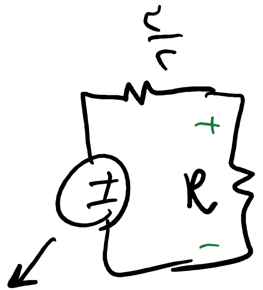
$v = R_{th}\, i + V_{th}$

$v = \frac{3}{2} i + \frac{1}{2} - \frac{3}{2}\cos t$

$\frac{3}{2}$: R_{th} ✓

$V_{th} = \alpha i_s + \beta v_s = 2\alpha + 2\beta\cos t$

$\alpha = \frac{1}{4}, \quad \beta = -\frac{3}{4}$

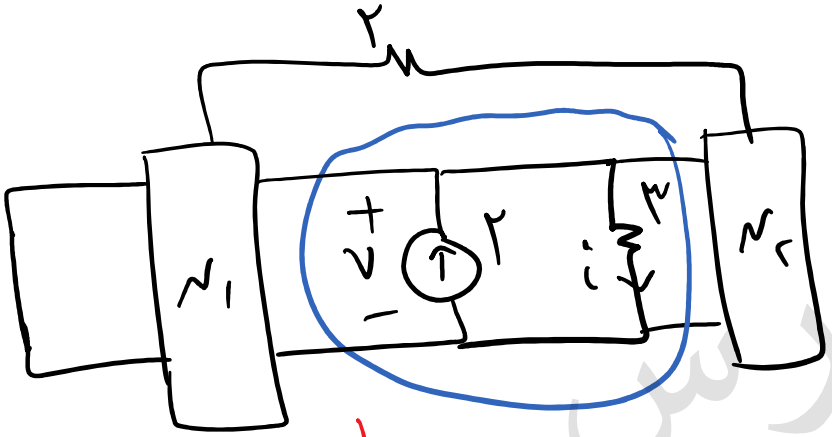


جدید $V_{th} = \frac{1}{4}(2\cos t) + \left(-\frac{3}{4}\right)(2) = \frac{\cos t}{2} - \frac{3}{2}$

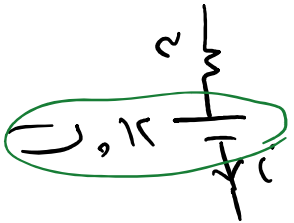
$V_{th_{rms}} = \sqrt{\frac{1}{8} + \frac{18}{8}} = \sqrt{\frac{19}{8}}$

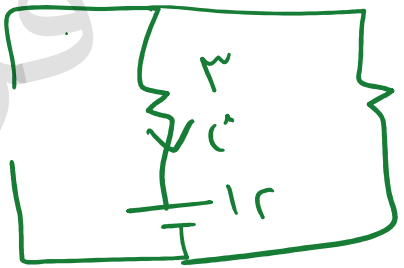
$P_{max} = \frac{19}{8} \times \frac{1}{4} \times \frac{2}{3} = \frac{19}{48}\ W$

فرادرس FaraDars.org



$$v = \frac{1}{2}$$

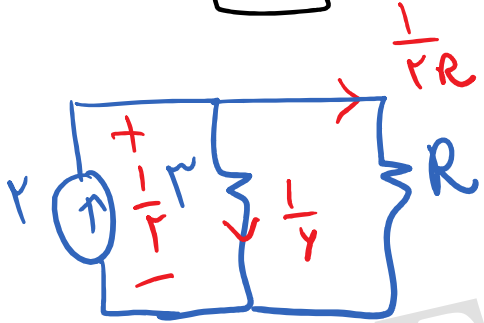




$$\frac{ث}{11}$$

$$ث = -\frac{12}{3 + \frac{ث}{11}}$$

$$= -\frac{11}{3}$$

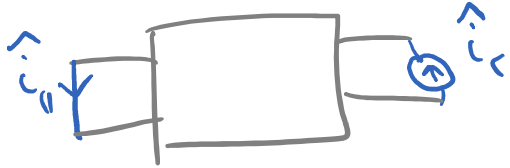


$$\frac{1}{2} + \frac{1}{2R} = 2 \Rightarrow \frac{1}{2R} = \frac{11}{2} \Rightarrow R = \frac{2}{11}$$

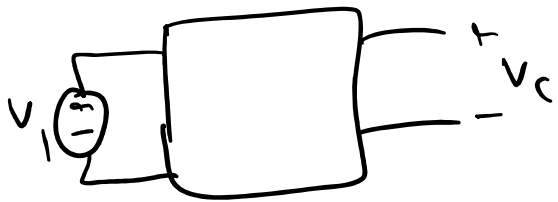
فرادرس
FaraDars.org

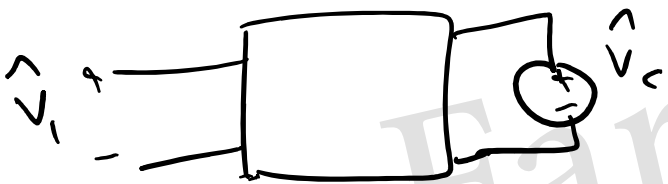
قضیه تعویض:

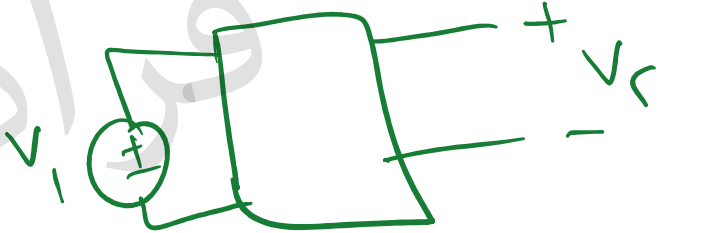
$$H_1(s) = \frac{i_2}{i_1}$$

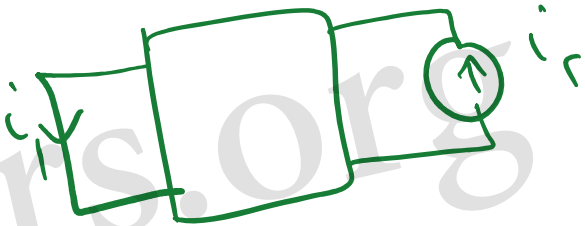


$$H_2(s) = \frac{\hat{i}_2}{\hat{i}_1}$$

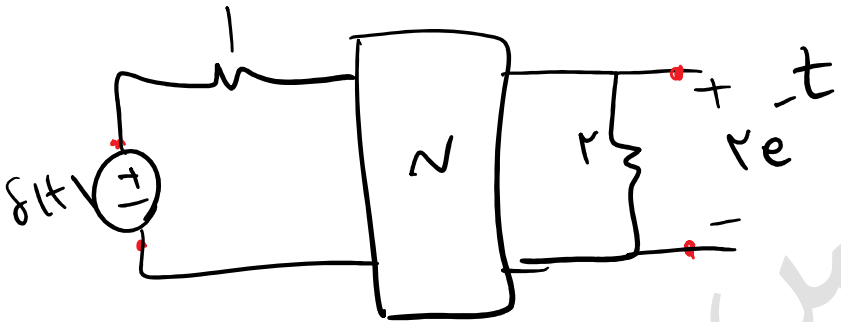


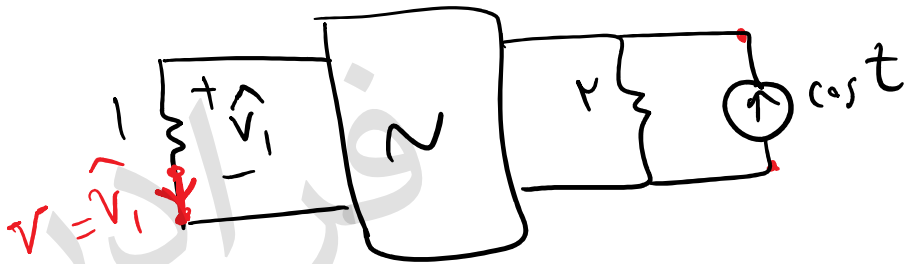






فرادرس
FaraDars.org

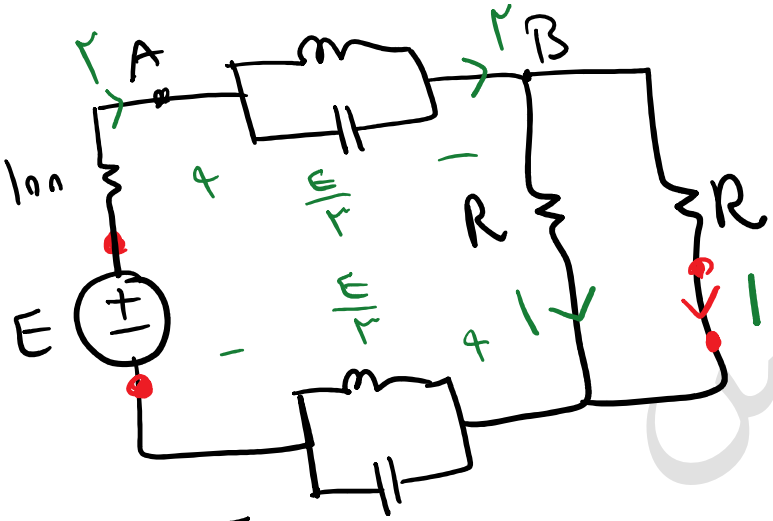




$$\frac{V}{\cos t} = \frac{۲}{s+۱} \Rightarrow \frac{\mathcal{V}}{۱} = \frac{۲}{۱+j} = \sqrt{۲}\angle -\frac{\pi}{۴}$$

$$\sqrt{۲}\cos\left(t-\frac{\pi}{۴}\right)$$

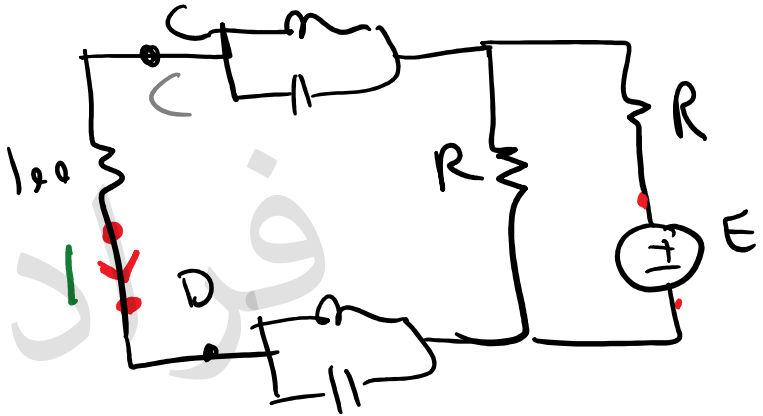
فرادرس
FaraDars.org



$$V_{AB} = \frac{E}{۳}$$

$$E = ۲۰۰ + \frac{۲}{۳}E + R$$

$$\frac{E}{۳} - ۲۰۰ = R$$



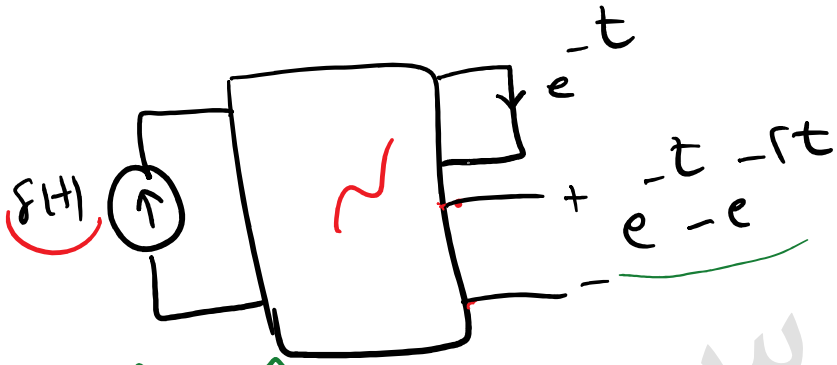
$$V_{CD} = \frac{E}{۳۰} = ۱۰۰$$

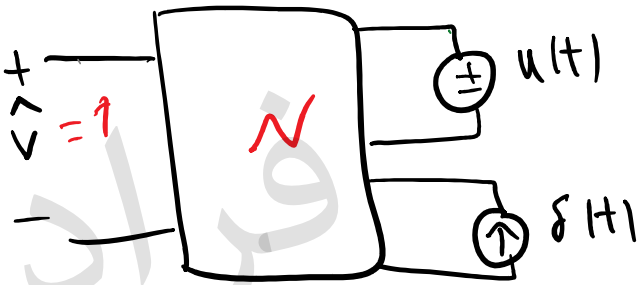
$$E = ۳۰۰$$

$$R = ۱۰۰\,\Omega$$

$$P = R$$

فرادرس
FaraDars.org





$$\hat{V} = \hat{V}_1 + \hat{V}_2$$

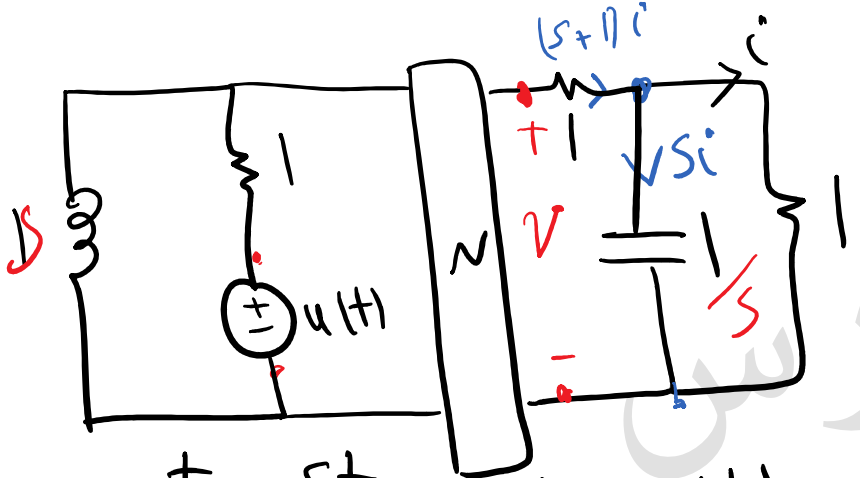
$$e^{-t} - e^{-2t}$$

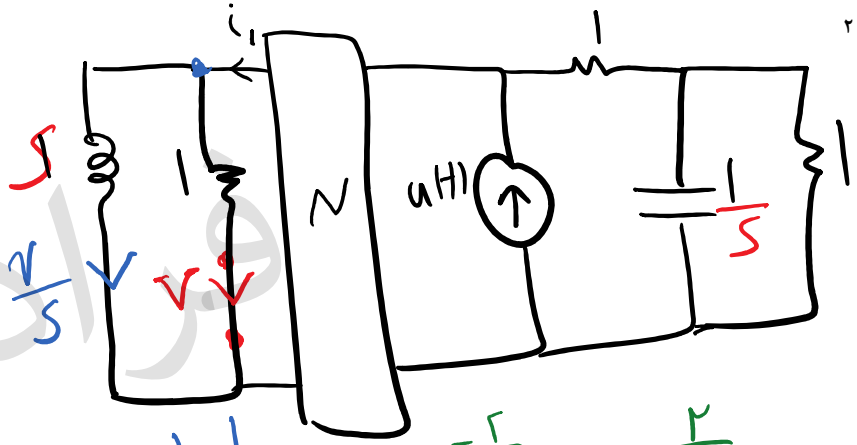
$$\frac{1}{s+1} = \frac{\hat{V}_c}{\frac{1}{s}} \Rightarrow \hat{V}_c = \frac{1}{s(s+1)} = \frac{-1}{s+1} + \frac{1}{s}$$

$$-e^{-t}u(t) \qquad u(t)$$

$$(1 - e^{-2t})u(t)$$

فرادرس
FaraDars.org





$$i = (2e^{-t} - e^{-2t} - e^{-2t})\,u(t)$$

$$i_1 = v\left(1 + \frac{1}{s}\right)$$

$$\frac{-\frac{2}{3}}{s} + \frac{-\frac{2}{3}}{s+3}$$

$$v = (s+2)\,i \Rightarrow (s+2)\left(\frac{s+1}{s}\right) i = i_1$$

$$i = \frac{2}{s+1} - \frac{1}{s+2} - \frac{1}{s+3} \Rightarrow i_1 = \frac{2(s+2)}{s} - \frac{s+1}{s} - \frac{(s+1)(s+2)}{s(s+3)}$$

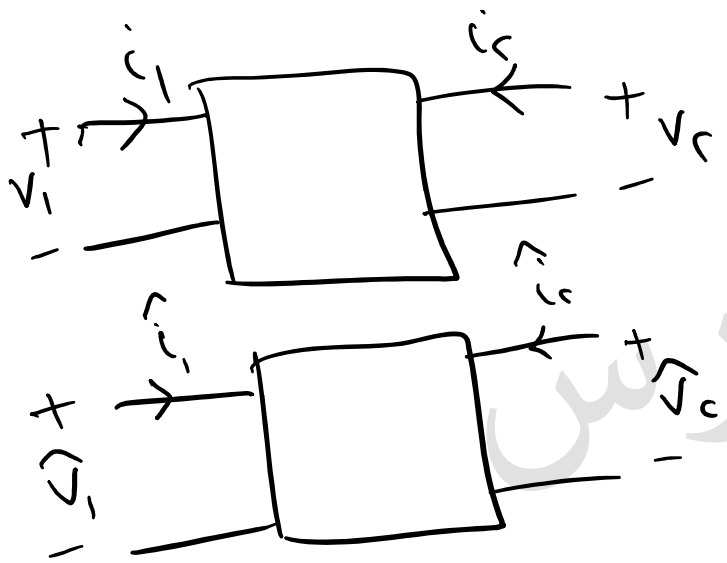
فرادرس
FaraDars.org

$$i_1 = \frac{2(s+2)}{s} - \frac{s+1}{s} - \frac{(s+1)(s+2)}{s(s+3)} = 2 + \frac{4}{s} - 1 - \frac{1}{s} - \frac{s^2+3s+2}{s^2+3s}$$

$$= 1 + \frac{3}{s} - 1 - \frac{2}{s(s+3)} = \frac{3}{s} - \frac{\frac{2}{3}}{s} - \frac{-\frac{2}{3}}{s+3}$$

$$= \frac{7}{3}\left(\frac{1}{s}\right) + \frac{2}{3}\frac{1}{s+3} \rightarrow \left(\frac{7}{3} + \frac{2}{3}e^{-3t}\right)u(t)$$

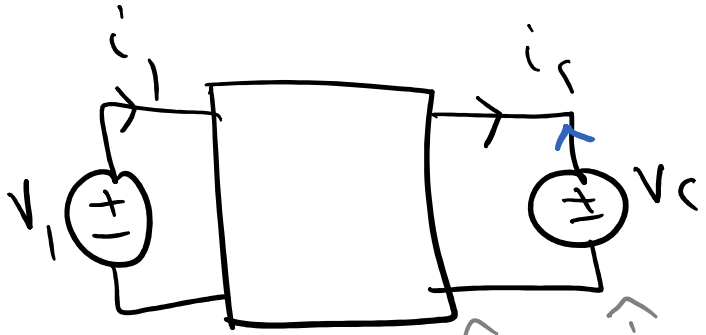
فرادرس
FaraDars.Org



تکمیل:

$$\hat{v}_1 i_1 + \hat{v}_c i_c = v_1 \hat{i}_1 + v_c \hat{i}_c$$

فرادرس
FaraDars.org



$$\hat{v}_1 i_1 + \hat{v}_c i_c = v_1 \hat{i}_1 + v_c \hat{i}_2$$

$v_1 = 30t$ $\quad i_1 = 5t$

$v_c = 0$ $\quad i_2 = 2t$

$\hat{v}_1 = 30t + 20$

$\hat{v}_2 = 20t + 18$

$\hat{i}_1 = ?$

$\omega(t+2) - (3t+1) = \hat{i}_1$

$t + 9 = \hat{i}_1$

فرادرس
FaraDars.org

این اسلاید ها بر مبنای نکات مطرح شده در فرادرس

«آموزش مدارهای الکتریکی ۲»

تهیه شده است.

برای کسب اطلاعات بیشتر در مورد این آموزش به لینک زیر مراجعه نمایید

faradars.org/fvee102

فرادرس
FaraDars.org