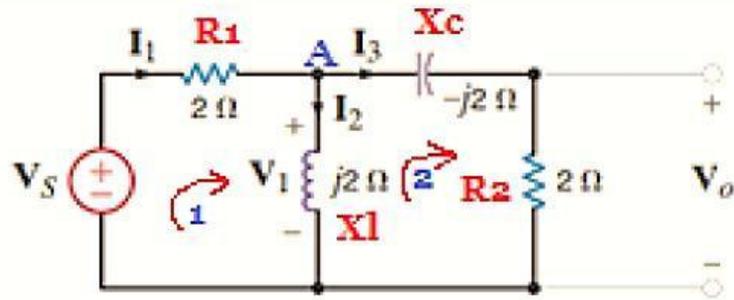


แบบฝึกหัดที่ 16	เรื่อง KVL / KCL	
รหัส 30104-1003	วิชา วงจรไฟฟ้า 2	
ชื่อ-สกุล	ชั้น	เลขที่

1. จงหาค่า V_S จากรูปวงจรต่อไปนี้ เมื่อกำหนดให้ $v_o = 8\angle 45^\circ V$



วิธีทำ จากกฎของโอห์ม: $I_3 = \frac{V_o}{R_2} = \frac{8\angle 45^\circ}{2} = 4\angle 45^\circ$

$V_c = I_3 \times X_c = 4\angle 45^\circ \times -j2 = 8\angle -45^\circ$

KVL ลูป 2: $V_c = V_{R2} + V_{X1}$

$8\angle -45^\circ = I_3 \times 2 + I_2 \times j2$

$8\angle -45^\circ = 4\angle 45^\circ \times 2 + I_2 \times j2$

$8\angle -45^\circ = 8\angle 45^\circ + I_2 \times j2$

$I_2 = \frac{8\angle -45^\circ - 8\angle 45^\circ}{j2} = \frac{8(\cos(-45^\circ) - j\sin(-45^\circ) - \cos(45^\circ) - j\sin(45^\circ))}{j2}$

$I_2 = \frac{8(\cos(45^\circ) - j\sin(45^\circ) - \cos(45^\circ) - j\sin(45^\circ))}{j2} = \frac{8(-2j\sin(45^\circ))}{j2} = \frac{-16\sin(45^\circ)}{j2} = \frac{-16 \times \frac{\sqrt{2}}{2}}{j2} = \frac{-8\sqrt{2}}{j2} = 4\sqrt{2}\angle 90^\circ$

$I_2 = 4\sqrt{2}\angle 90^\circ$

$I_2 = 4\sqrt{2}\angle 90^\circ$

$I_2 = 4\sqrt{2}\angle 90^\circ$

KCL ที่จุด A: $I_1 = I_2 + I_3$

$I_1 = 4\sqrt{2}\angle 90^\circ + 4\angle 45^\circ$

KVL ลูป 1: $V_S = V_{R1} + V_{X1}$

$V_S = (I_1 \times 2) + I_2 \times j2$

$$\begin{aligned}
&= (\text{blue} \angle \text{blue}^\circ + \text{yellow} \text{blue} \angle \text{blue}^\circ) + \text{yellow} \text{blue} \angle \text{blue}^\circ \\
&= \text{blue} \angle \text{blue}^\circ + \text{yellow} \text{blue} \angle \text{blue}^\circ \\
&= \text{blue} \text{yellow} \text{blue} \text{yellow} \text{blue} \text{yellow} \text{blue} \\
&= \text{blue} \text{yellow} \text{blue} \\
&= \text{blue} \angle \text{blue}^\circ \quad \boxed{} \quad \textit{Ans.}
\end{aligned}$$