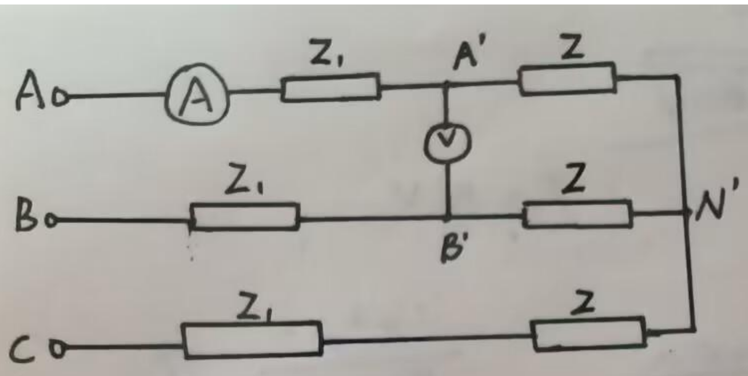
电路作业（九）

12-5



解：(1) 令 $\varphi = 0°$

∴ $\dot{U}_{A'N'} = \dfrac{\dot{U}_{A'B'}}{\sqrt{3}} = 660\angle 0° V$

∴ $\dot{I}_A = \dfrac{\dot{U}_{A'N'}}{Z} = 22\angle -60° A$

∴表A的读数为 22 A

$\dot{U}_{AN'} = \dot{I}_A(Z+Z_1) = 709.11\angle 0.24° V$

$U_{AB} = \sqrt{3}U_{AN'} = 1228.2V$

(2) $\bar{S}_A = I_A^2 Z = (22)^2 \cdot (15+j15\sqrt{3}) = (7260+j12574.69) A\cdot V$

(3) ∴ $\dot{U}_{A'N'} = 0$

∴ $\dot{I}_A' = \sqrt{3}\dot{I}_A = 22\sqrt{3}\angle -60° A$

读数为 $22\sqrt{3}A$

U_{AB} 不变. $\bar{S}_A' = 3\bar{S}_A = (21780+j37724.07) V\cdot A$

(4) A相开路. 则 B.C 串联

∴负载电压为原来的 0.866 倍

(5) ∴ $\dot{U}_{NN'} = 0$

使各相星形负载在各自相电压下工作. 保持独立性

12-9

(1) 令对称线电压 $\dot{U}_{AB}=1\angle 0°\,V$

$\therefore \dot{I}_{AB}=G.\ \dot{I}_{BC}=j\omega C\angle -120°$

$\dot{I}_{CA}=-j\dfrac{1}{\omega L}\angle 120°$

$\dot{I}_A=\dot{I}_{AB}-\dot{I}_{CA}=G-\dfrac{1}{\omega L}\angle 30°$

$\dot{I}_B=\dot{I}_{BC}-\dot{I}_{AB}=j\omega C\angle -120°-G$

$\dot{I}_C=\dot{I}_{CA}-\dot{I}_{BC}=-j\dfrac{1}{\omega L}\angle 120°-j\omega C\angle -120°$

$\dot{I}_A=\dot{I}_B\angle 120°=\dot{I}_C\angle -120°$

$\therefore \omega C=\dfrac{1}{\omega L}=\dfrac{G}{\sqrt{3}}$

$\therefore \dot{I}_A=\dfrac{1}{\omega L}\angle 30°\,A.\ \dot{I}_B=a^2\dot{I}_A.\ \dot{I}_C=a\dot{I}_A$

(2) $R=\infty$. 开路

$\therefore \dot{I}_A=\dfrac{1}{\omega L}\angle -150°\,A$

$\dot{I}_B=\omega C\angle -30°\,A$

$\dot{I}_C=\dfrac{1}{\omega L}\angle 90°\,A$

12-12

(1) 设 $\dot{U}_A = 220\angle 0° \ V$

$\therefore \dot{I}_{AB} = \frac{\sqrt{3}\dot{U}_A\angle 30°}{R} = 1.9\angle 30° \ A$

$\dot{I}_A = 3.29A \ . \ \dot{I}_B = a^2\dot{I}_A \ . \ \dot{I}_C = a\dot{I}_A$

$\therefore P = 3(I_{AB}^2 R) = 2166W$

(2) $\bar{S} = P + jQ = (2166 - j1520\sqrt{3}) V\cdot A$

$= 3409.22\angle -50.56° \ V\cdot A$

$\therefore \dot{I}_A = \frac{\bar{S}^*}{3\dot{U}_A^*} = 5.17\angle 50.56° \ A$

12-14

解：令 $\dot{I}_A = I_A\angle 0° \ A$

$\dot{I}_L = \dot{I}_B + \dot{I}_C$

$\therefore \frac{\sqrt{3}\dot{I}_A R\angle 30°}{j\omega L} = j\omega C\cdot\sqrt{3}\dot{I}_A R\angle -90° + \dot{I}_A\angle -120°$

$\therefore \omega L = \frac{1}{\omega C} = 34.64\Omega$

$L = \frac{34.64}{\omega} = 110.32mH$

$C = \frac{1}{34.64\omega} = 91.94\mu F$