继电保护作业 2

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1. (1)

$$t_4 = t_1 + \Delta t = 1.1s$$
$$t_7 = t_4 + \Delta t = 1.6s$$
$$t_{10} = t_7 + \Delta t = 2.1s$$
$$t_9 = t_{11} + \Delta t = 1.7s$$
$$t_6 = t_9 + \Delta t = 2.2s$$
$$t_3 = t_6 + \Delta t = 2.7s$$

(2) 9,7,4 要加装功率方向元件

2. (1)

$$t_{10} = t_{12} + \Delta t = 1.5s$$
$$t_6 = t_{10} + \Delta t = 2s$$
$$t_3 = t_6 + \Delta t = 2.5s$$
$$t_1 = t_3 + \Delta t = 3s$$
$$t_5 = t_{16} + \Delta t = 1s$$
$$t_8 = t_7 + \Delta t = 2s$$
$$t_{11} = t_8 + \Delta t = 2.5s$$
$$t_{14} = t_{11} + \Delta t = 3s$$

(2) 2,5,10,13 需要加装功率方向元件

3. 对于 I_B I_C:

$$\cos(\varphi_k - 120^\circ + \alpha) = \cos(70^\circ - 120^\circ + 30^\circ) = 0.94$$
$$\cos(\varphi_k - 60^\circ + \alpha) = \cos(70^\circ - 60^\circ + 30^\circ) = 0.77$$

而 0.94>0.77，所以（1）方式灵敏度更高

4.

(1)

$$K_{bra} = \frac{I_{BC}}{I_{AB}} = \frac{X_{L2} + X_{S,1} + X_{S,2}}{X_{S,2}} = 4$$

(2)

$$I_{K,C,max} = \frac{E_1}{(X_{S,1} + X_{L2})//X_{S,2} + X_{L1}} = 1.47kA$$

$$I^I_{set,1} = K_{rel} * I_{K,C,max} = 1.76kA$$

$$I^{II}_{set,2} = \frac{K^{II}_{rel}}{K_{bra}} * I^I_{set,1} = 0.53kA$$

$$I_{K,B,min} = \frac{\sqrt{3}}{2} * \frac{E_1}{X_{L1} + X_{S,1}} = 2.02kA$$

由于 II 段保护只作为近后备使用，则

$$K_{sen} = \frac{I_{K,B,min}}{I^{II}_{set,2}} = 3.81$$