Mesafe Korumasında Topraklama Faktörü

Kategory	**tester**
Bölüm	**AMT Mesafe Modülü**
Dil	**Türkçe**
Oluşturuldu	**2026-11-04**

$$V_{L1E} = 20v.e^{j0}$$

$$I_{L1} = I_E = 2A.e^{-j30}$$

Şekil 1

$$TypeA : X = 4.4\Omega; R = 7.0\Omega$$

$$TypeB : X = 4.2\Omega; R = 6.2\Omega$$

$$TypeC : X = 4.2\Omega; R = 8.2\Omega$$

Şekil 2

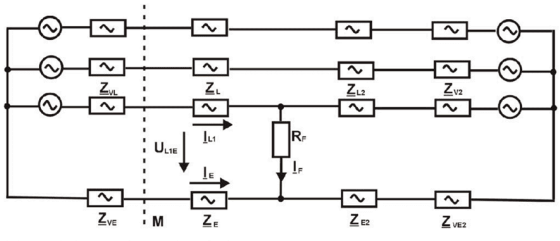


Figure 1: Single-phase fault in a doubly fed line

M: Measurement point
$\underline{Z}_L$: Line impedance from M to the fault location
$\underline{Z}_E$: Grounding impedance from M to the fault location
R_F: Arc resistance
$\underline{Z}_{L2}$: Line impedance from the fault location to the end of the line
$\underline{Z}_{E2}$: Grounding impedance from the fault location to the end of the line
$\underline{Z}_{VX}$: Impedances of the preceding network

Şekil 3

$$V_{LE1} = I_{LE}.Z_{L1} - I_E Z_E. + R_F I_F.$$

Şekil 4

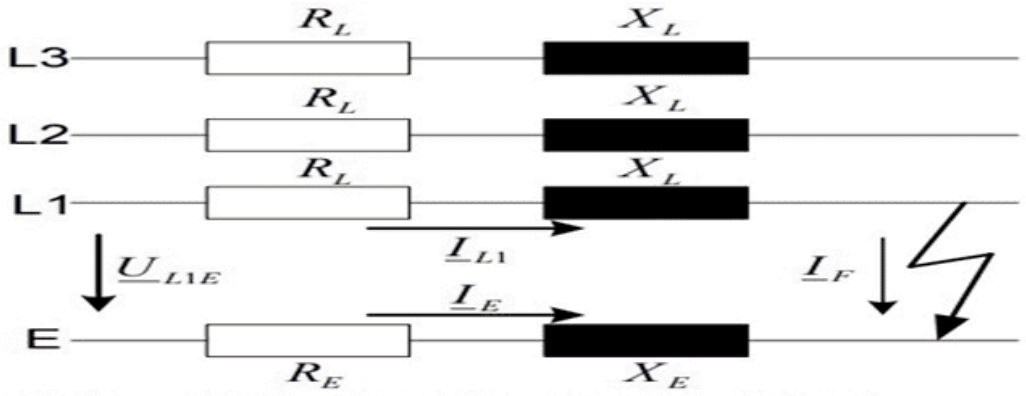


Figure 2: Line section with an L1-ground short circuit

Şekil 5

$$Z_S = Z_L + Z_E$$

$$Z_L = R_L + JX_L$$

$$Z_E = R_E + JX_E$$

$$Z_{SE} = \frac{Z_{0S} - Z_{1S}}{3}$$

Şekil 6

$$K_L = \frac{Z_E}{Z_L}$$

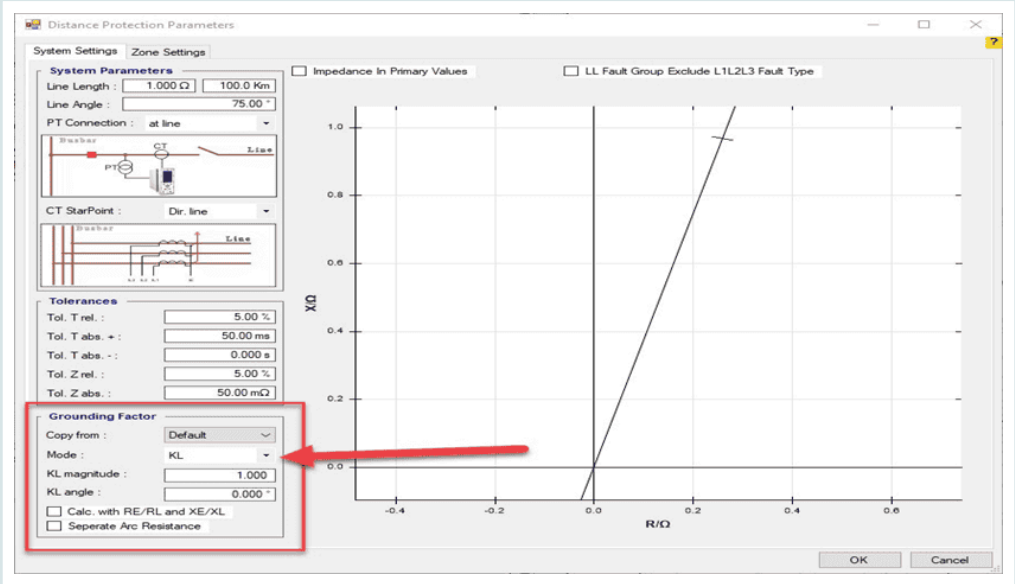
$$K_0 = \frac{Z_0}{Z_1}$$

Şekil 7

$$K_r = \frac{R_E}{R_L}$$

$$K_x = \frac{X_E}{X_L}$$

Şekil 8



Şekil 9

$$K_L = \frac{K_0 - 1}{3}$$

$$K_L = \frac{K_r}{1 + j\frac{R_L}{X_L}} + \frac{K_x}{1 - j\frac{X_L}{R_L}}$$

Şekil 10

$$V_{L1E} = I_{L1E}.Z_{L1} - I_E.Z_E$$

$$Z_E = K_L.Z_L$$

$$\Rightarrow V_{L1E} = I_{L1E}.Z_{L1} - K_L.Z_L$$

Şekil 11

$$Z_{TypeA} = R_{TypeA} + jX_{TypeA} = \frac{\frac{V}{I}}{1+K_L}$$

Şekil 12

$$V_{L1E} = I_{L1E}.(R_L + jX_L) - I_E.(R_E + jX_E)$$

$$R_E = K_r.R_L$$

$$X_E = K_x.X_L$$

$$V_{L1E} = I_{L1E}.(R_L + jX_L) - I_E.(K_r.R_L + jK_x.X_L)$$

Şekil 13

$$X_{TypeB} = \frac{\mathrm{Im}\left\{\frac{V}{I}\right\}}{1+K_x}$$

$$R_{TypeB} = \frac{\mathrm{Re}\left\{\frac{V}{I}\right\}}{1+Kr}$$

$$|Z| = \sqrt{R^2 + X^2} \qquad \varphi = \tan\left(\frac{X}{R}\right)$$

Şekil 14

$$X_{TypeC} = \frac{\mathrm{Im}\left\{\frac{V}{I}\right\}}{1+K_x}$$

$$R_{TypeC} = \mathrm{Re}\left\{\frac{V}{I}\right\} - X_{TypeC}.\arctan(\varphi_L).K_r$$

Şekil 15

	X_{meas} =	R_{meas} =
Type A	$\mathrm{Im}\left\{\frac{\underline{U}/\underline{I}}{1+\underline{K}_L}\right\}$	$\mathrm{Re}\left\{\frac{\underline{U}/\underline{I}}{1+\underline{K}_L}\right\}$
Type B	$\frac{\mathrm{Im}\{\underline{U}/\underline{I}\}}{1+K_x}$	$\frac{\mathrm{Re}\{\underline{U}/\underline{I}\}}{1+K_r}$
Type C	$\frac{\mathrm{Im}\{\underline{U}/\underline{I}\}}{1+K_x}$	$\mathrm{Re}\{\underline{U}/\underline{I}\} - X_{TypeC}\cdot\arctan(\varphi_L)\cdot K_r$

Şekil 16

	X_{meas} =	R_{meas} =
Type A	$X_L + \mathrm{Im}\{R_F/(1+\underline{K}_L)\}$	$R_L + \mathrm{Re}\{R_F/(1+\underline{K}_L)\}$
Type B	X_L	$R_L + R_F/(1+K_r)$
Type C	X_L	$R_L + R_F$

Şekil 17