Zig-Zag Grounding Transformer

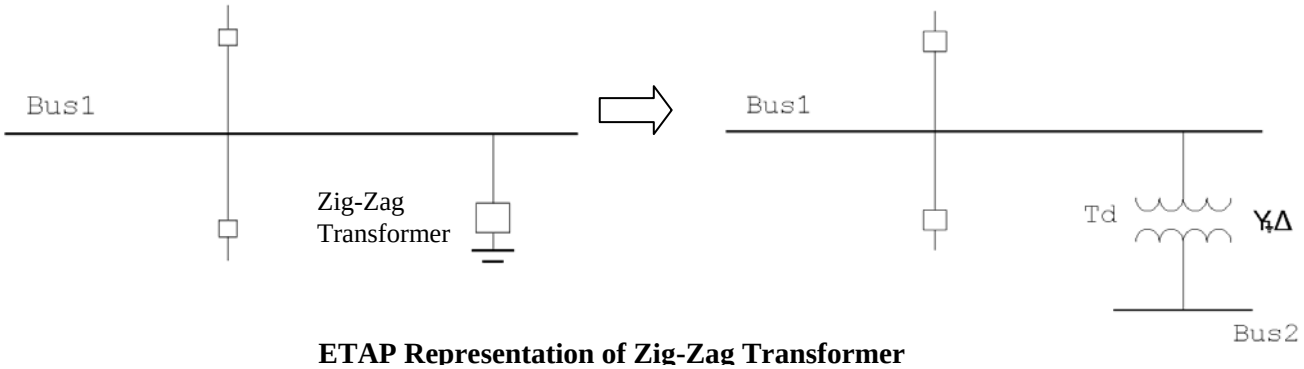
Description: Modeling of a Zig-Zag Grounding Transformer
Category: Transformer, Zig-Zag Grounding Transformer
Type: Modeling
Keywords: Zig-Zag Grounding Transformer

Operation of a Zig-Zag Grounding Transformer

- During normal operation the current flowing in the zig-zag transformer is the magnetizing current which is very small compared to the normal operating current and hence is negligible
- Under a line to ground fault the current flowing to the ground through the zig-zag transformer is equal to the rated neutral current, if 100% line to neutral voltage is applied

ETAP Representation

A zig-zag grounding transformer can be represented in ETAP by a R / Δ transformer with Δ side bus open:



ETAP Representation of Zig-Zag Transformer

Notes:

- Td is a R / Δ connected transformer with a voltage ratio of 1 and Bus2 is a Dummy Bus.
- There is nothing connected to Bus2 except the transformer Td.

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Equivalent Parameters

The parameters of transformer Td are calculated as follows:

Let the **zig-zag transformer** have the following rating:

$MVAzz$
$kVzz$ (Line to Line)
Ig, zz (Ground Current)
$Zzz = 100\%$

Therefore, the equivalent parameters of the **transformer Td** will be:

$$MVA = MVAzz$$
$$kV_{prim} = kVzz$$
$$kV_{\sec} = kVzz$$
$$Z_{Td} = 100 \times \frac{3 \times kVzz \times 1000}{\sqrt{3} \times Ig, zz} \times \frac{MVA}{kV^2{}_{prim}} = 100\%$$