Verification of Directional Overcurrent Relay characteristics

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DISCUSSION:

The directional overcurrent relay characteristics and external characteristics were plotted in the curve for 2 cases. From the curves, we observed and analysed that:
for Case 1: $\beta = 145°$ and $\gamma = -35°$ and for Case 2: $\beta = 80°$ & $\gamma = -120°$. for both the cases the fault current, nominal current and pickup current were kept the same.
It was observed in the first case that the trip region was between -32° and 142° while set values were -35° & 145°. Thus experimental error is very small here. for Case 2: the angles were -123° & 81°, again the experimental error is just ~~too~~ having a few difference under permitted experimental error.
It is also observed that the trip region is tighter that set characteristics in Case-1 while wider in case-2.
The error can be reduced by varying the phase angle between voltage and current more ~~slowly~~ ~~be~~ slowly and take more values at actual values of β & γ.
→ Performance can be improved by using a positive source component, operating the lines within the ~~sequence~~ block region with a sufficient safety major and we quadrature voltages to determine if relay should trip when the fault is close.

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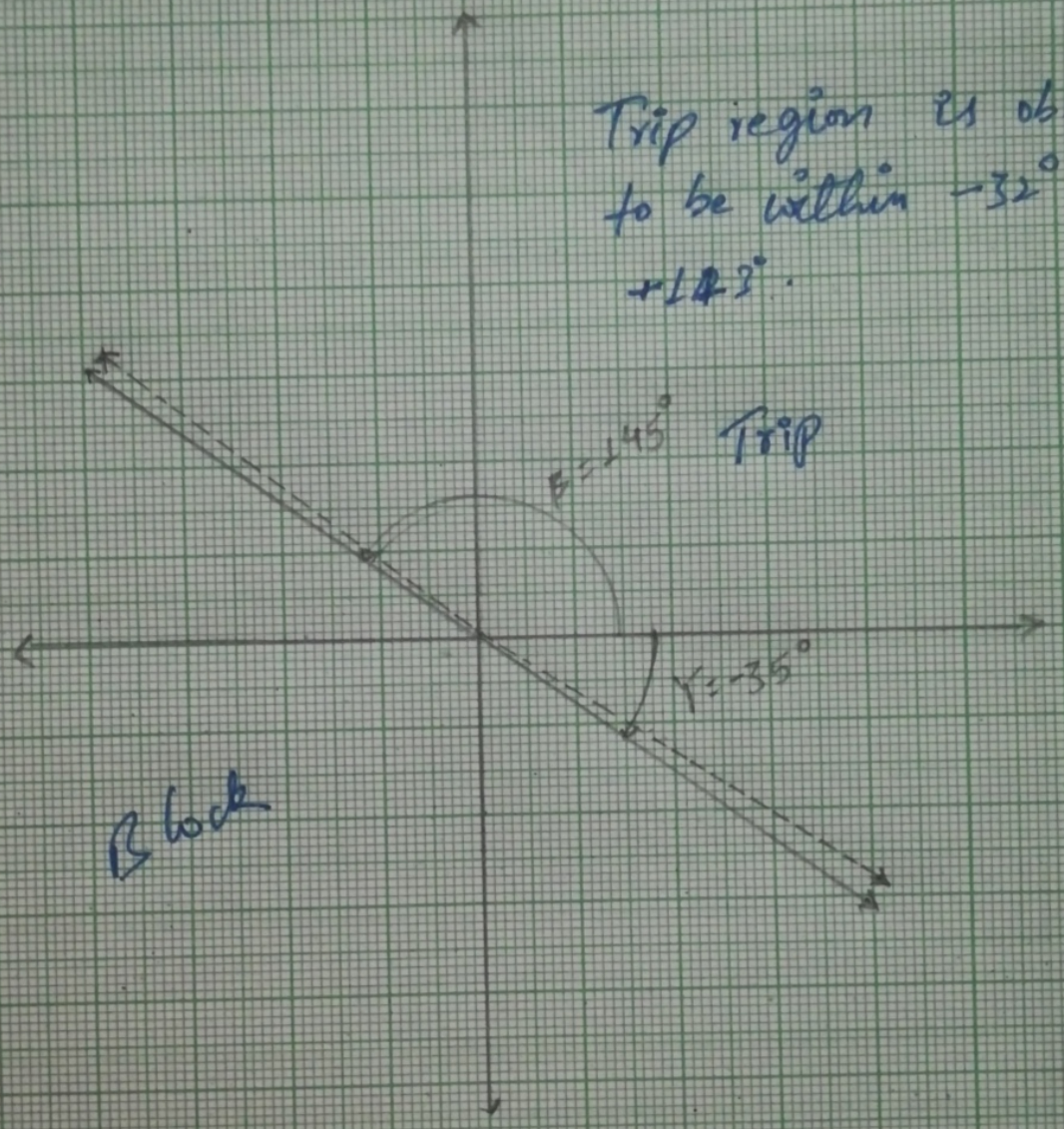
Case 1: $\beta = 145°$, $\gamma = -35°$

→ Set Characteristics

--→ Observed Characteristics

Trip region is observed to be within $-32°$ and $+143°$.



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Case 2: $\beta = 80°$, $\gamma = -120°$

→ Set Characteristics

---→ Observed Characteristics

Trip region is observed to be within $-120°$ and $80°$.