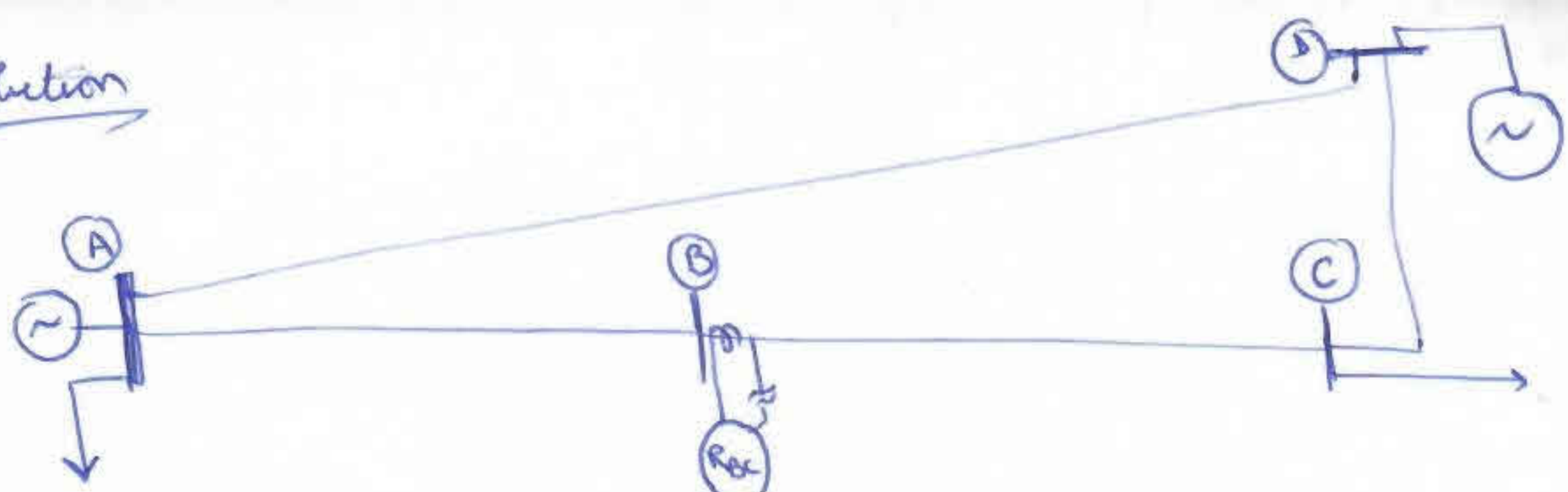
Solution



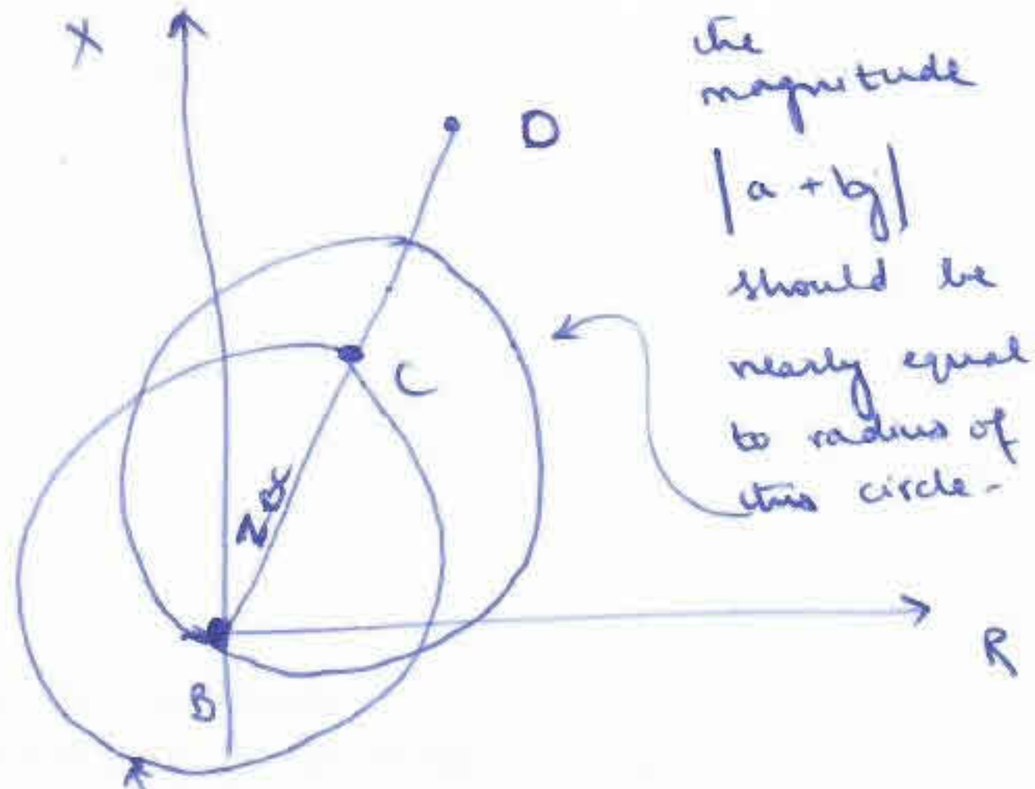
Evaluation of settings

for the IZB - reach of the fwd tripping relay should over-reach the next terminal - based on this principle the given setting $(a+bj)$ can be arrived if:

$$(a+bj)\,\Omega > 1.2 - 1.5 \text{ times of } Z_{BC}$$

Similarly for the relay at station C,

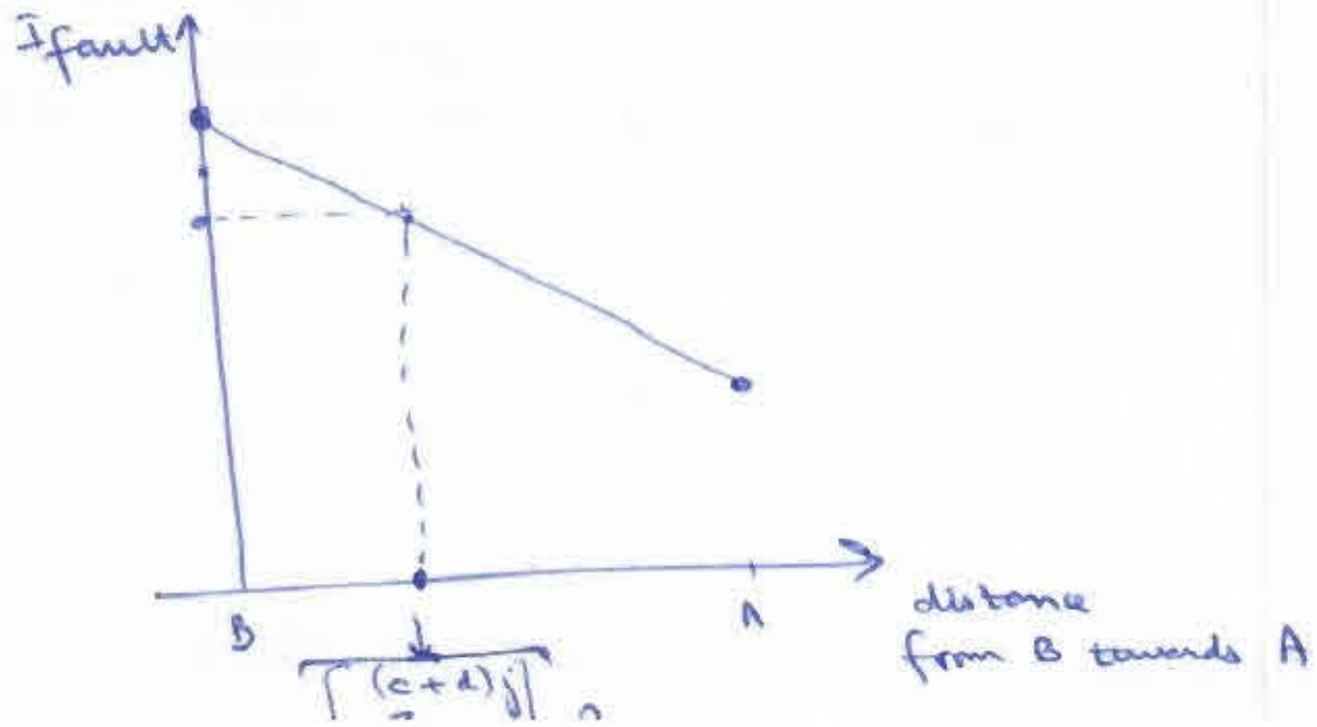
$$(c+dj)\,\Omega > 1.2 - 1.5 \text{ times of } Z_{BC}$$



Ease of Blocking relay

The blocking relay at B has to be more sensitive than the reach of the forward tripping relay RCB - whose setting is $(c+dj)\,\Omega$ -

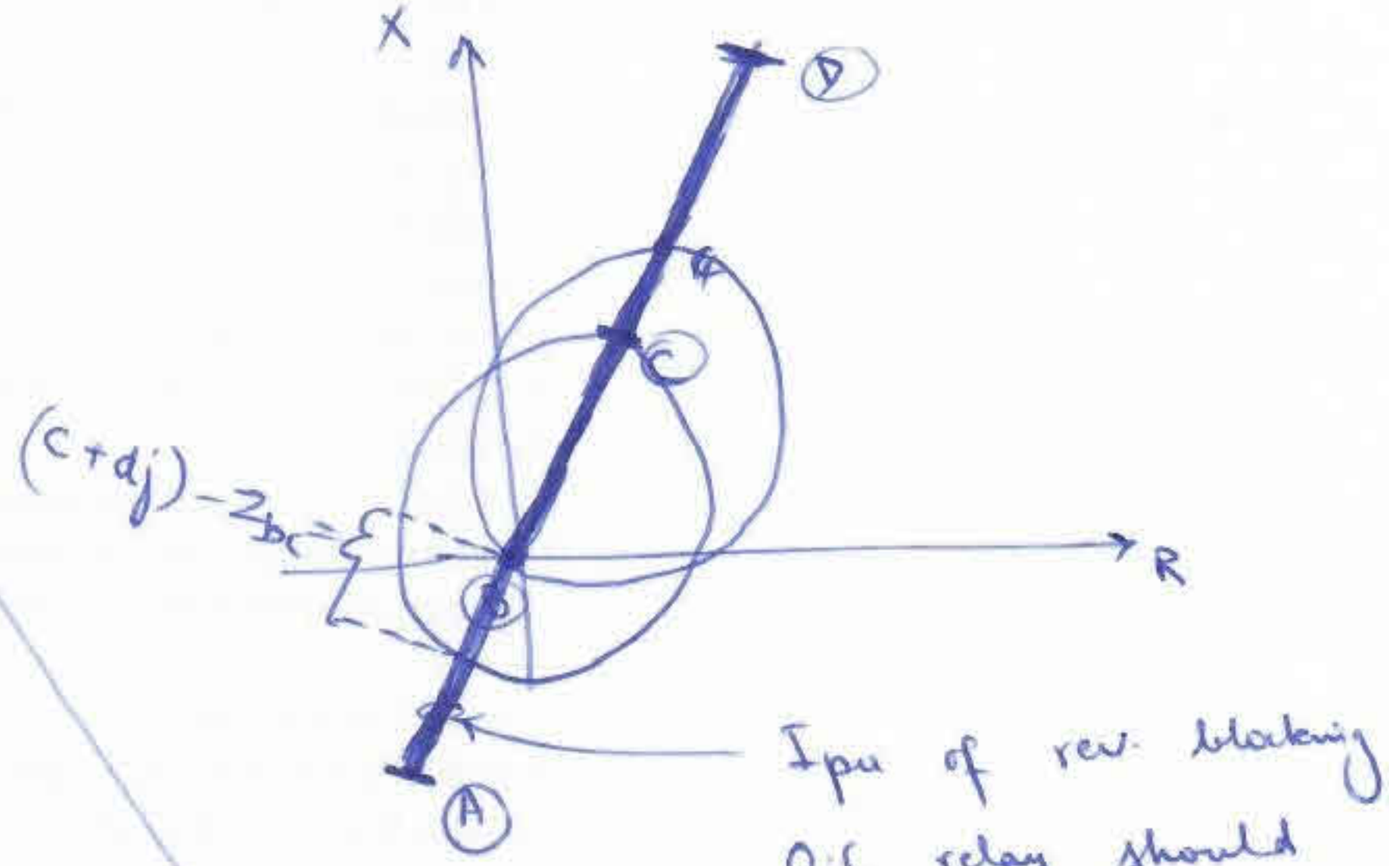
To evaluate the blocking relay settings; line fault characteristics need to be consulted - These may be as shown here



fault current lowers as we go from B to A -

At the reach limit of RCB - fwd - trip, the distance as measured from B is $(c+dj) - Z_{CB}$ -

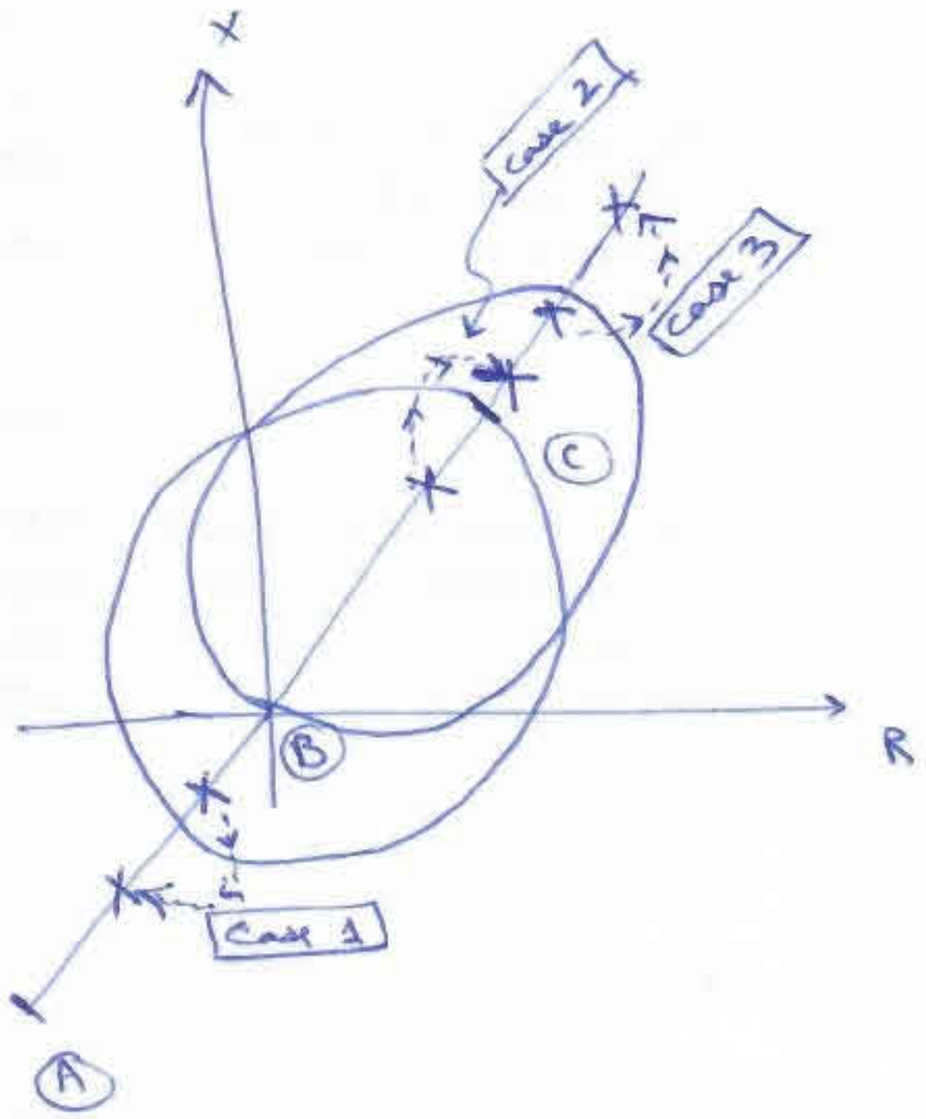
The pickup value of the O.C. relay which will generate a blocking signal should be lower than the I-f-min at the point of $(c+dj)-Z_{CB}$ in the fault characteristics of the AB line —— this will ensure that its reach is farther than the reach of the fwd - tripping relay R_{CB} —— Again sketching R-X diagram



Case of fault R

Case 1 fault in section AB —

A fault here may lead to current flow lower than Ipu of rev. blocking O.C relay but at the same time, this fault Z will add to Zseen of RCB - The relay RCB will see this outside its reach of $(c+dj)$ & so this not operate — And this is the correct action ——



Case 2 fault on BC line

Zseen may be beyond C but still in reach of RBC which will trip - & no blocking signal will be given b/c fault is actually on line BC & direction O.C. blocking relay does not see it

Case 3 fault beyond C ie in CB

An impedance fault may push Zseen out of reach for RBC - but this is not a problem as