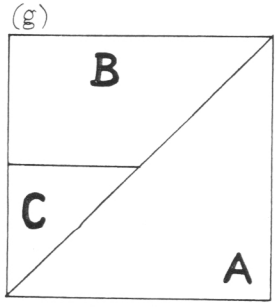
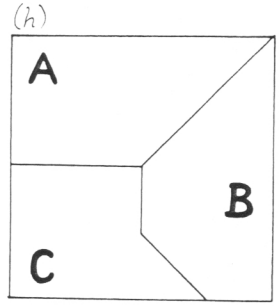
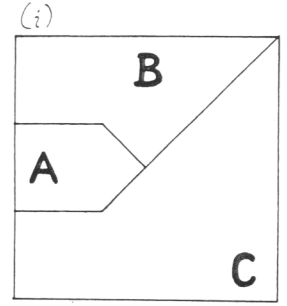
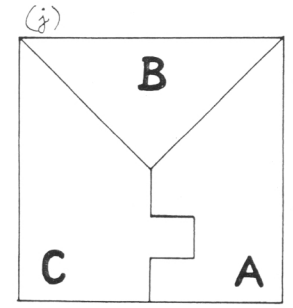
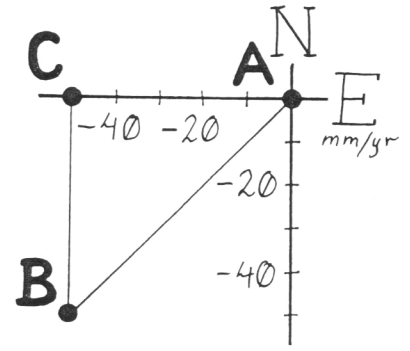


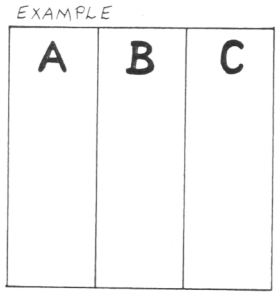


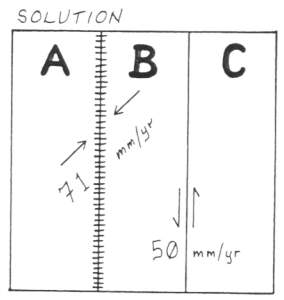


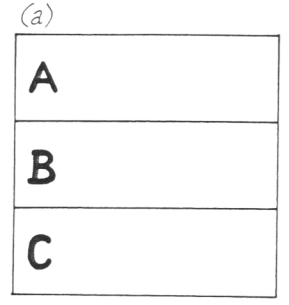


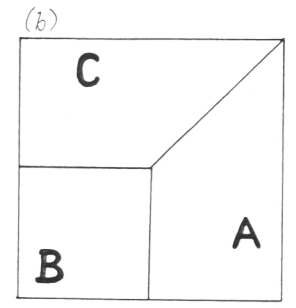
2-2. The plates are now moving as shown below. Proceed as before.

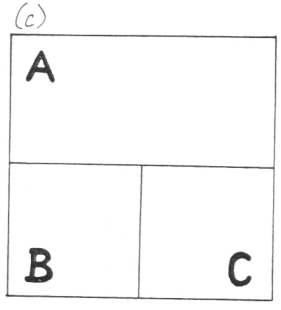


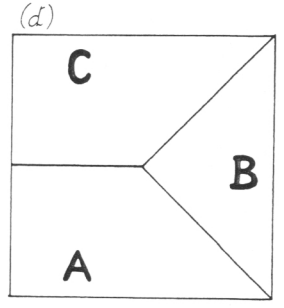


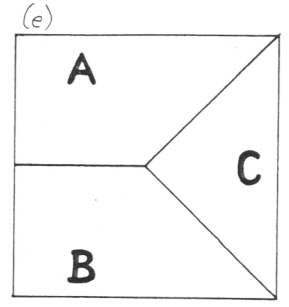


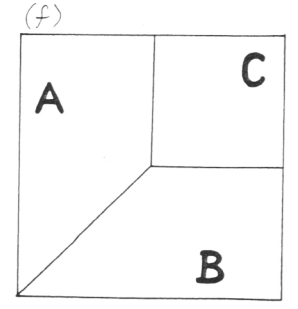








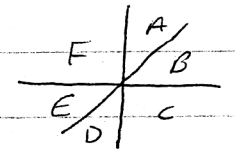




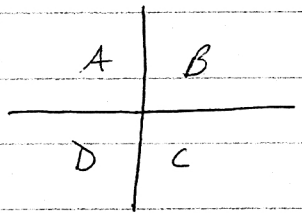
Triple Junctions

How many plates can come together at a point and remain there?

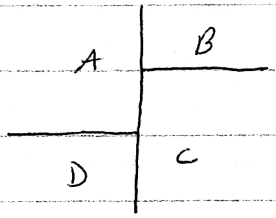
in theory - many



this never happens. How about 4?

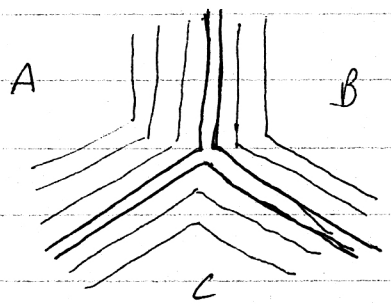


no - this is also unstable
For example, make one a transform fault



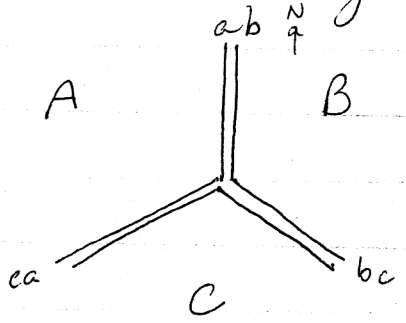
We now consider three plates - a triple junction
Are triple junctions possible? Are they stable?
We see them in nature so they are possible. But - are they stable?

Consider a ridge-ridge-ridge triple junction RRR TJ



the isochrons away from the RRR TJ suggest stability

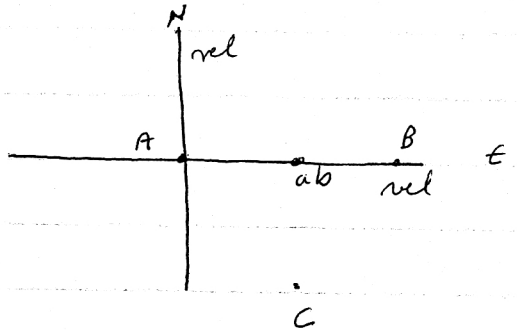
label the ridges



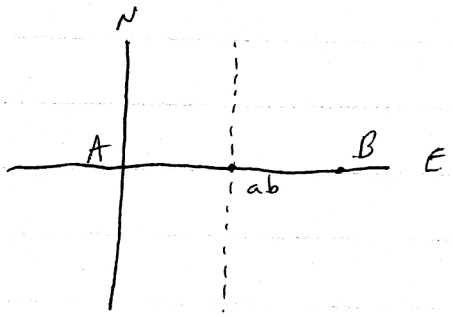
to determine stability we must plot the plate boundaries in velocity space

Stability ⇒ if all three boundaries intersect in velocity space

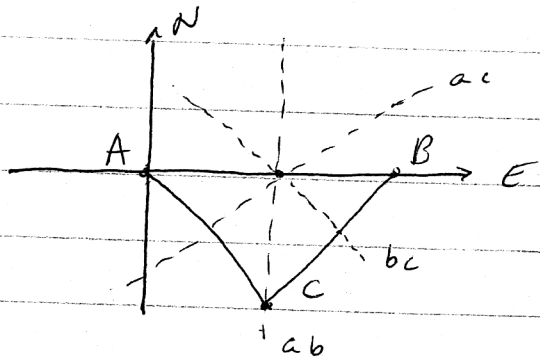
plot the plates in velocity space



ridge ab moves away from A at $\frac{1}{2}$ the whole spreading rate
B moves away from A at the whole spreading rate. So-
ab plots halfway between A and B
Ask- how is ridge ab oriented? (N S)
at what velocity can we travel along the ridge and still remain on it? (any velocity) In velocity space this is



now consider the other two ridges connect the plate locations



This is a stable triple junction because the three plate boundaries meet at one point. Thus there is a velocity that keeps all three plates connected

How does the TJ move wrt plate A? (to the east)
wrt plate B? (to the west)
wrt plate C? (to the north)

Subduction boundary

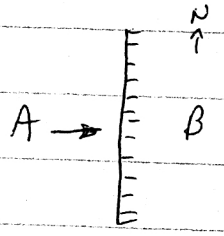
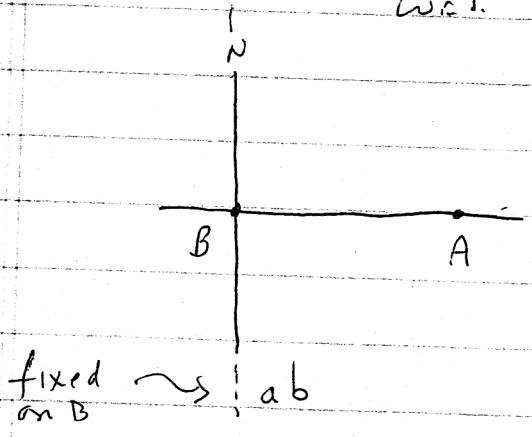


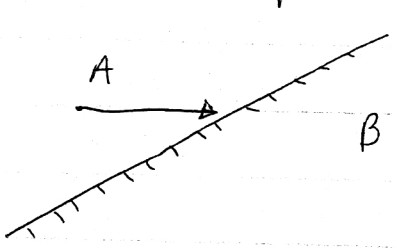
plate A is subducting below plate B

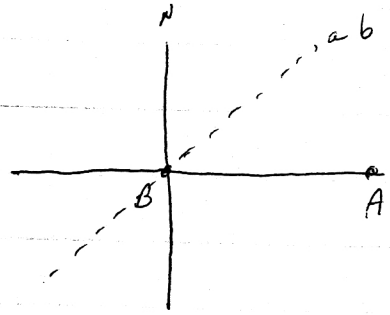
In this case the plate boundary is fixed wrt. plate B



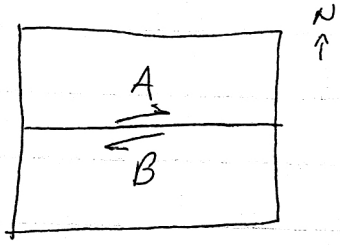
Ask - in what direction does the boundary trend? (NS)
At what velocity can we travel in a NS direction and always stay on the boundary? (all)

another example : oblique subduction

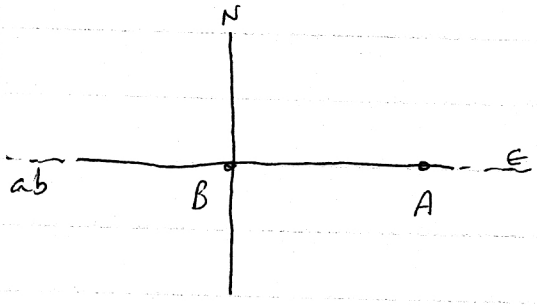




transform fault



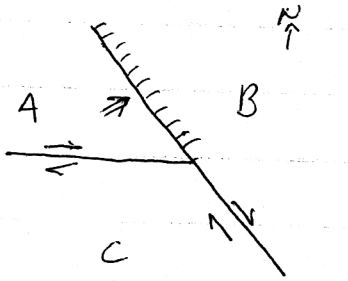
here, the plate boundary is fixed on both plates



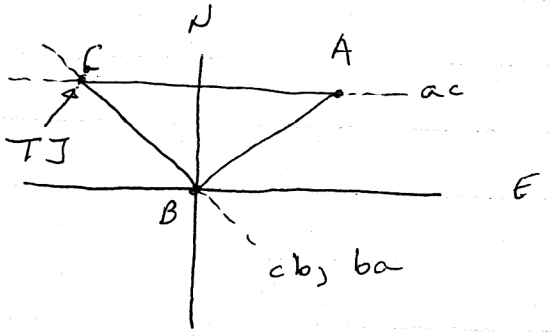
Ask: which way does the boundary trend? (E W)

At what velocity can we travel in an EW direction and always remain on the boundary? (all)

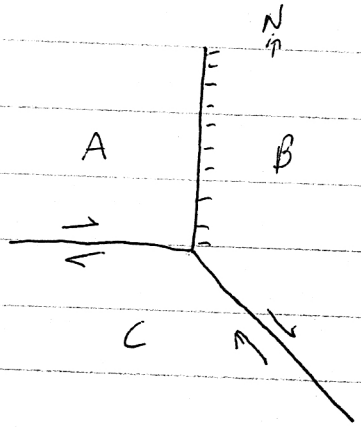
Now we can do all TJ problems

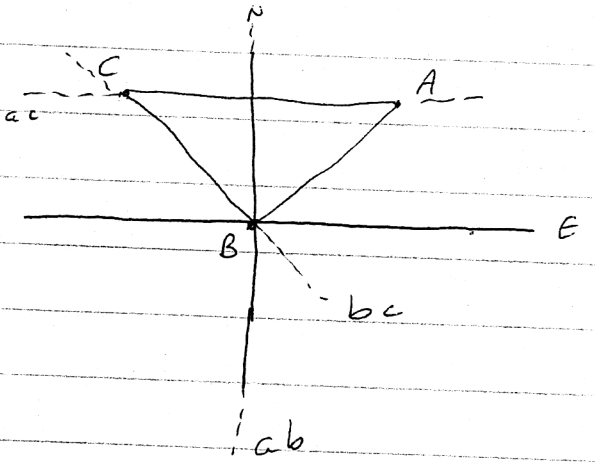


start with the transforms to get the plate triangle

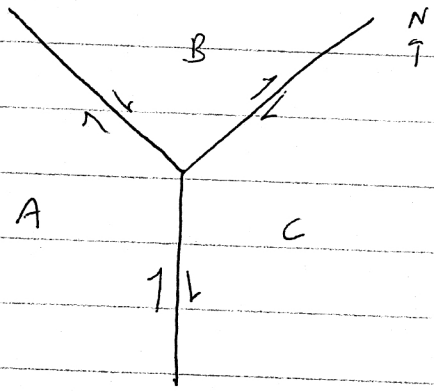


TJ fixed on C, moves to the west wrt A, to the northwest wrt B

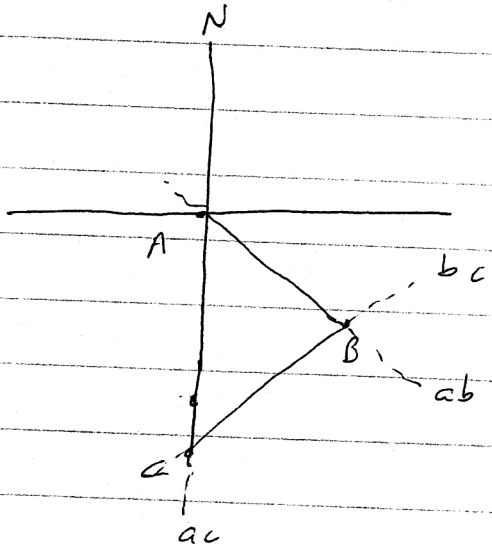


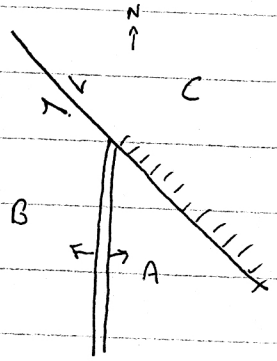


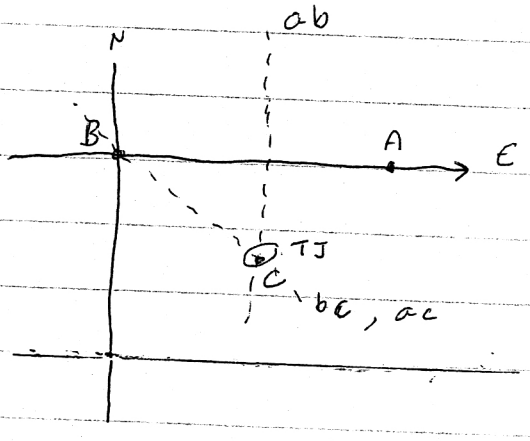
not stable !



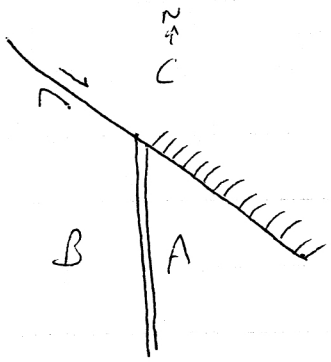
never stable

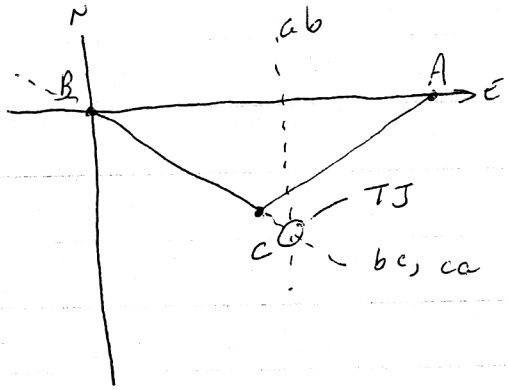




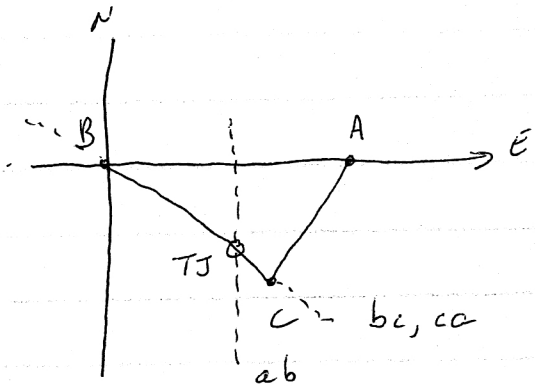


here spreading rate is just right to keep the TJ fixed on plate c

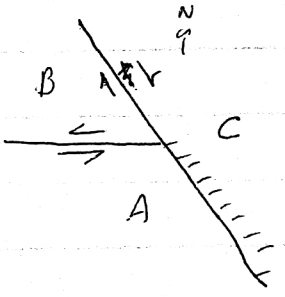


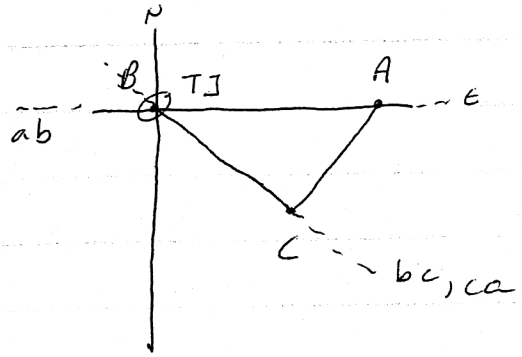


fast spreading at ridge so TJ still stable but moves to the SE wrt plate C



s/w spreading, the TJ moves to the NW wrt plate C





ridge is subducted.
TJ moves to the NW wrt plate C