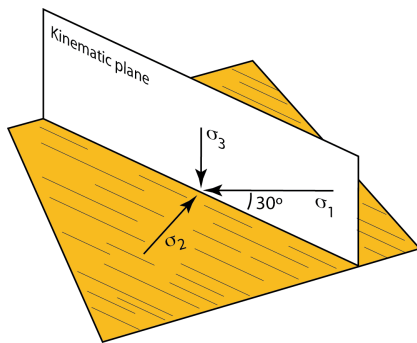


PRACTICAL ON FAULT DATA AND PALEOSTRESS ANALYSIS

Fault data including strike-dip-dip direction, the pitch of the striae, and the fault kinematic can be used to determine the orientation of the principal stress axes responsible for the formation of newly formed faults or reactivation of pre-existing faults. There is a number of methods for paleostress analysis from simple graphical procedures to more complex and computer intensive techniques. However, all are based on a few simple assumptions. We review here two simple graphical methods to derive the orientation of the principal stress axes from a population of faults

The optimum stress method:

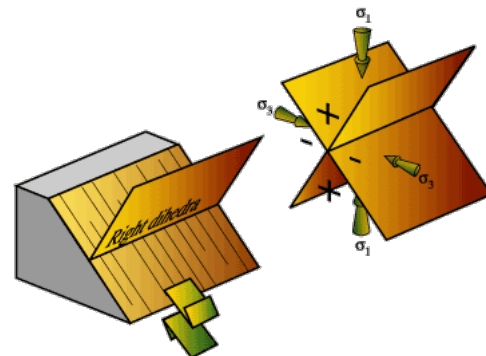
The kinematic plane is the plane perpendicular to the fault plane and parallel to the striae. This plane contains both σ_1 and σ_3 , and therefore σ_2 is parallel to the pole of the kinematic plane. Assuming that the fault plane is newly formed, the optimum position of σ_1 with respect to the fault is 30° to the fault plane. To get a robust result, this method must be applied to a large number of co-genetic fault planes.



The right dihedral method:

The fault plane and the plane perpendicular to the kinematic plane (right dihedral plane below) divide the space around the fault into four symmetric sectors, two are in compression (compressional dihedral, + in the sketch below), the two others in extension (extensional dihedral, - in the sketch below).

σ_1 and σ_3 can be located anywhere in the compressional and extensional dihedral respectively. For a fault population, σ_1 and σ_3 will be located in the compressional and extensional regions common to all faults.



Assignment: From the fault data listed on the table below and using the stereonet, infer the orientation of the principal stress axes using (1) the optimum stress method, and (2) the right dihedral method. Compare and comment on the results.

Fault ID	Strike	Dip-Dip Dir.	Pitch-Pitch Dir.	Kinematic
1	010	90	16 S	S
2	012	80E	04 S	SR
3	164	78E	12 N	DR
4	006	86W	10 N	DN
5	084	42S	80 E	R

NB: Kinematic (Sinistral, Dextral, Normal, Reverse)