Joints and Veins

Joints:

Fractures in rocks across which there is no visible displacement parallel to the fracture plane

The most common structure!

Veins: Fractures filled with mineral deposits (solution-precipitation), may host ore deposits

Dikes: Fractures filled with melt.

Joint sets and systems

Joints commonly occur as families with more or less regular spacing in a given rock type. This type of joints are called systematic joints. There are irregular (non-systematic) joints such as those you see in concrete blocks.

Joint set: a group of joints of common origin, commonly but not always approximately parallel to each other

Joint system: the whole assemblage of joints present in an outcrop.

Examples of Tesile Joints and Shear Joints

Exfoliation: produced as a result of exhumation.

en echelon tension veins

Conjugate pair of joints

How Joints form?

Two modes of fracture

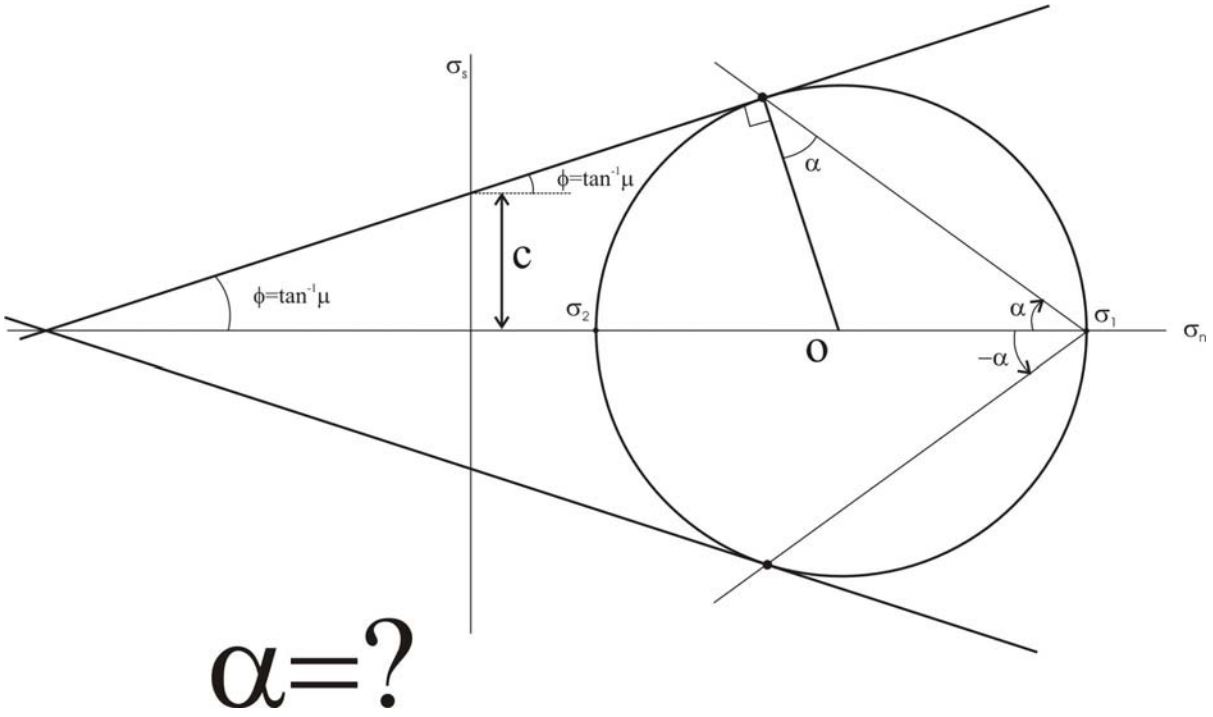
Tensile fracture: fracture surface normal to the minimum principal stress, occurring when

$$\sigma_3 = -T_0$$

Shear fracture: conjugate joint sets forming "X" patterns

$$\sigma_s = \mu\sigma_n + C$$

Conjugate shear fractures



$\alpha = ?$

Orientation of shear fractures with respect to the principal stresses.

Inferring principal stress orientations from conjugate pairs of joints

Friction angle of rocks