Stress ratio and stress tensor using Andersonian theory

# General expression of the Andersonian remote stress

is oriented toward the north (y-axis) and is up (z-axis).

The stress ratio is defined as for the three fault regimes.

Also, can incorporate the fault regime which gives a continuous variation of defined as

for normal fault regime

for strike-slip fault regime

for reverse fault regime

is the clockwise rotation matrix along the z-axis of an angle , and is given by

# Normal fault regime

The stress ratio is used to express the stress tensor in a normal fault regime. Using

we have

and

Using we have

or

# Using alpha-shape

# Strike-slip fault regime

The stress ratio is used to express the stress tensor in a strike-slip fault regime. Using

we have

and

Using we have

or

# Using alpha-shape

# Reverse fault regime

The stress ratio is used to express the stress tensor in a reverse fault regime. Using

we have

and

Using we have

or

# Using alpha-shape

# Alpha-shape

For all three fault regimes, we have

With

The is used to have .

# Failure plane

Procedure:

1. Compute the normal for the 2 failure planes given the friction angle:
2. From a given normal, get the dip- and strike-angle: