# Problem and Dataset Overview

This preliminary dataset should be a set of stress states of yield points for plastic strain (epvm\_eq\_0.csv) and (epvm\_deq\_0.csv). The stresses are in Voigt notation, i.e.,

The goal is to find a transformation tensor () that transforms the anisotropic yield surface (the provided data) to a fictitious isotropic yield surface. That is, a von Mises surface with a unit yield stress, .

Currently, *direct\_mapping\_experiment.py* solves the problem in principal stress space. Therefore, the input stresses are 3x1 rather than 6x1 (as above). To accommodate a 6x6 transformation matrix, the symmetric tensor on lines 184-186 will need to be upgraded to support any arbitrary stress state:

represents the von Mises yield criterion for any stress tensor (and not just in the principal basis). The result transformation tensor () should (for now) follow the following conditions:

1. There should be 9 independent components, explicitly named in the matrix below.
2. The matrix is symmetric.

# Suggested Step 1: Sanity Check

How I would approach this problem would first figure out how to impose symmetry for the Hill experiment (i.e., lines 254-260). There should be a symmetric 3x3 solution to this problem. **I am unsure if this solution is unique.** In other words, there **may** be multiple distinct solutions that are valid. This solution, (), should satisfy the following tensor equation for :

Let me know when you obtain a solution, regardless of if it satisfies this equation: it may be that this above equation has a mistake in it.