MEEG 4703 Quiz t2.183

1. (10 pts) Making use of the laws of transformation for second-order Cartesian tensors, prove that the trace of the stress tensor at point *P* of a machine is an *invariant* under rotations of the coordinate axes at point *P*; i.e.,

$$\sigma_{ii} = \sigma_{ii}'$$

- 2. (10 pts) Using index notation, prove the *identity* $(A \times B) \times (C \times D) = B(A \cdot C \times D) - A(B \cdot C \times D)$
- **3.** (10 pts) Using index notation, prove the *identity*

 $(\mathbf{A} \times \mathbf{B}) \cdot (\mathbf{B} \times \mathbf{C}) \times (\mathbf{C} \times \mathbf{A}) = (\mathbf{A} \cdot \mathbf{B} \times \mathbf{C})^2$