

### 7.1 Irreducible tensor components.

The antisymmetric tensor components are given by

$$A_{\mu\nu} = \frac{1}{2} (T_{\mu\nu} - T_{\nu\mu}) .$$

The definition is invariant under general coordinate transformations  $f_\nu^\mu = \frac{\partial \tilde{x}^\mu}{\partial x^\nu}$ , since

$$2\tilde{A}_{\mu\nu} = \tilde{T}_{\mu\nu} - \tilde{T}_{\nu\mu} = f_\mu^\rho f_\nu^\sigma T_{\rho\sigma} - f_\nu^\rho f_\mu^\sigma T_{\rho\sigma} \quad (161)$$

$$= f_\mu^\rho f_\nu^\sigma T_{\rho\sigma} - f_\nu^\sigma f_\mu^\rho T_{\sigma\rho} = f_\mu^\rho f_\nu^\sigma (T_{\rho\sigma} - T_{\sigma\rho}) = f_\mu^\rho f_\nu^\sigma 2A_{\rho\sigma} \quad (162)$$

Here we used first the transformation law for a tensor of rank 2, and exchanged then dummy indices in the second term.