Stuff

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October 12, 2021

Metric

You can raise an index by

$$g^{\mu\nu}a_\nu = a^\mu$$

You can lower an index by

$$g_{\mu\nu}a^\nu = a^\mu$$

The metric satisfies

$$g_{\mu\nu} = g_{\nu\mu}$$
$$g_{\nu\rho}g^{\rho\mu} = \delta^\mu_\nu$$

A vector is a vector if it transforms like

$$v'^\mu = \Lambda^\mu_\nu v^\nu$$
$$v'_\mu = \Lambda^\nu_\mu v_\nu$$

A tensor is a tensor if all of its indices transform as above.