# Exchangeable Singular Decomposition

## 1 Why

Suppose a measure is not exchangeable with another. Then what. We can separate out the troublsome piece; perhaps it can be handled separately. TODO

## 2 Result

**Proposition 1.** *Let $(X, \mathcal{A})$ be a measurable space. Let $\mu$ be a measure on $(X, \mathcal{A})$. Let $\nu$ be a finite signed measure or complex measure or $\sigma$-finite measure on $(X, \mathcal{A})$. There there is a unique decomposition $\nu = \nu_a + \nu_s$ where $\nu_a \ll \mu$ and $\nu_s \perp \mu$.*

The above is also called *Lebesgue's Decomposition Theorem*.