



## Constrained Quadratic Form Extrema

### 1 Why

Eigenvalues

### 2 Result

**Proposition 1.** *A necessary condition for a maximizer of  $x^T Ax$  subject to  $x \in \mathbf{R}^n$  and  $x^T x = 1$  is that  $Ax = \lambda x$  where  $\lambda$  is the Lagrange multiplier... TODO: lagrange multiplier, gradient, quadratic form, necessary conditions, etc.*