

TEMPLE UNIVERSITY
Department of Mathematics

**Joint
Analysis Seminar
and
Applied Mathematics and
Scientific Computing Seminar**

Room 617 Wachman Hall

Monday, 20 February 2006, 2:40 p.m.

**Angles Between Subspaces and
Norms of Idempotents
on a Hilbert Space**

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Abstract. An idempotent operator P on a Hilbert space, i.e., an operator satisfying $P^2 = P$, can be considered as an oblique projector onto its range $\mathcal{R}(P)$ along (or parallel to) its null space $\mathcal{N}(P)$. We will discuss several concepts and identities about angles between (non null) subspaces, with emphasis the subspaces $\mathcal{R}(P)$ and $\mathcal{N}(P)$. When P is neither null nor the identity, it holds that $\|P\| = \|I - P\|$. This useful equality, while not widely-known, has been proven repeatedly in the literature. Many published proofs will be reviewed.