

# Some Remarks On Essentially Normal Submodules

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(Submitted on 3 Apr 2012)

Given a \*-homomorphism  $\sigma: C(M) \rightarrow \mathcal{L}(\mathcal{H})$  on a Hilbert space  $\mathcal{H}$  for a compact metric space  $M$ , a projection  $P$  onto a subspace  $\mathcal{P}$  in  $\mathcal{H}$  is said to be essentially normal relative to  $\sigma$  if  $[\sigma(\varphi), P] \in \mathcal{K}$  for  $\varphi \in C(M)$ , where  $\mathcal{K}$  is the ideal of compact operators on  $\mathcal{H}$ . In this note we consider two notions of span for essentially normal projections  $P$  and  $Q$ , and investigate when they are also essentially normal. First, we show the representation theorem for two projections, and relate these results to Arveson's conjecture for the closure of homogenous polynomial ideals on the Drury-Arveson space. Finally, we consider the relation between the relative position of two essentially normal projections and the  $K$  homology elements defined for them.

Subjects: **Functional Analysis (math.FA)**  
MSC classes: 47A13, 46E22, 46H25, 47A53  
Cite as: **arXiv:1204.0620 [math.FA]**  
(or **arXiv:1204.0620v1 [math.FA]** for this version)

## Submission history

From: Kai Wang [[view email](#)]  
[v1] Tue, 3 Apr 2012 08:16:27 GMT (12kb)

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