Perinormality in Polynomial and Module-Finite Ring Extensions

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ABSTRACT

In this dissertation we investigate some open questions posed by Epstein and Shapiro in [9] regarding perinormal domains. More specifically, we focus on the ascent/descent property of perinormality between "canonical" integral domain extensions, in particular, $R \subset R[X]$ and $R \subset \hat{R}$. We give special conditions under which perinormality ascends from $R$ to the polynomial ring $R[X]$ in the case that $R$ is a universally catenary domain. Whereas we have a characterizing result for when perinormality descends from $R[X]$ to $R$, the sufficient condition for the descent is cumbersome to check. For this reason, we turn to special cases for which perinormality descends from $R[X]$ to $R$. In the case of an analytically irreducible local domain $(R, \mathfrak{m})$ and its $\mathfrak{m}$-adic completion $(\hat{R}, \mathfrak{m}\hat{R})$, we refer to a technique for generating examples in which perinormality fails to ascend. When $\hat{R}$ is perinormal, we explore hypotheses under which $R$ must be normal, perinormal, or weakly normal.