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Huneke-Wiegand Conjecture and Change of Rings

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Let R be a Cohen-Macaulay local ring of dimension one with a canonical module K_R . Let I be a faithful ideal of R . We explore the problem of when $I \otimes_R I^\vee$ is torsionfree, where $I^\vee = \text{Hom}_R(I, K_R)$. We prove that if R has multiplicity at most 6, then I is isomorphic to R or K_R as an R -module, once $I \otimes_R I^\vee$ is torsionfree. This result is applied to monomial ideals of numerical semigroup rings. A higher dimensional assertion is also discussed.

This is a joint work with Ryo Takahashi, Naoki Tanoguchi, and Hoang Le Truong.