Kuei-Nuan Lin* (link@purdue.edu), 150 N. University St., West Lafayette, IN 47907. Diagonal ideals of determinantal rings.

Let $k$ be a field, $m \leq n$ positive integers, $X = (x_{ij})$ an $m$ by $n$ matrix of variables over $k$, $I_m(X)$ the ideal of $k[[x_{ij}]]$ generated by the maximal minors of $X$, and $R = k[[x_{ij}]]/I_m(X)$. We consider the diagonal ideal $\mathcal{D}$ of $R$, defined via the exact sequence

$$0 \rightarrow \mathcal{D} \rightarrow S = R \otimes_k R \xrightarrow{\text{mult}} R \rightarrow 0.$$  

Recall that $\mathcal{R}(\mathcal{D}) \otimes S k$ is the homogeneous coordinate ring of the secant variety of the determinantal variety $V(I_m(X)) \subset \mathbb{P}^{mn-1}_k$, where $\mathcal{R}(\mathcal{D})$ denotes the Rees algebra of $\mathcal{D}$. It is classically known that the secant variety is all of projective space in this case. We extend this fact by showing that $\mathcal{D}$ is an ideal of linear type, which means that the natural map from the symmetric algebra $\text{Sym}(\mathcal{D})$ onto the Rees algebra $\mathcal{R}(\mathcal{D})$ is an isomorphism. (Received September 15, 2008)