1114-13-319 **Youngsu Kim*** (youngsu.kim@ucr.edu), Department of Mathematics, 900 Univ. Ave., Surge 253, Riverside, CA 92521, and **Vivek Mukundan** (vmukunda@purdue.edu), Department of Mathematics, 150 N Univ. ST, West Lafayette, IN 47907. *Bi-degrees of defining equations of Rees algebras of homogeneous height two perfect ideals.*

Let R be a ring and I an R-ideal. The Rees algebra of I is a graded algebra $R[It] = \oplus_{I \geq 0} I^i$, where $I^0 = R$. If $I = (f_1, \ldots, f_n)$, then there exists a natural homogeneous presentation $\phi : T := R[X_1, \ldots, X_n] \to R[It]$ sending X_i to $f_i t$. The kernel of ϕ is called the defining ideal (equations) of the Rees algebra of I.

When R is graded and I is homogeneous R-ideal, defining ideals are bi-graded, the gradings of R and of X_i, respectively. We investigate the bi-degrees of defining ideals under the following set up: R is a d-dimensional polynomial ring over a field, m the homogeneous maximal ideal, $I = I_d(\varphi)$, and grade $I = 2$, where φ is $d+1$ by d matrix such that the entries of column i have degree d_i for $1 \leq i \leq d$. Here, $I_d(\varphi)$ denotes the ideal generated by d by d minors of φ.

Note that ϕ factors through $\operatorname{Sym}(I)$ the symmetric algebra of I. Under our setup the kernel of the map $T \to \operatorname{Sym}(I)$ is a complete intersection and $(\ker \phi)\operatorname{Sym}(I)$ is equal to $0 :_{Sym(I)} m^\infty$. We study $\ker \phi$ through the Koszul resolution of $\operatorname{Sym}(I)$ as T-module. Such technique was introduced by Kustin-Polini-Ulrich when $\dim R = 2$. (Received August 31, 2015)