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BUCHSBAUM SUBVARIETIES OF CODIMENSION 2 IN $\mathbf{P}^n$

MEI-CHU CHANG

Over the past several years there has been considerable activity in the topics of Buchsbaum rings and arithmetically Buchsbaum projective curves, some of which was described in the book [**3**]. Recall that a local (resp. graded) ring A is Buchsbaum if the difference $l_A(A/\mathbf{x}A) - e(\mathbf{x}, A)$ is independent of the (homogeneous) system of parameters $\mathbf{x}$, where l_A and e are the length and multiplicity respectively. A subvariety Y in $\mathbf{P}^n$ is called arithmetically Buchsbaum if its homogeneous coordinate ring $\bigoplus H^0(\mathcal{O}_{\mathbf{P}^n}(k))/\bigoplus H^0(\mathcal{I}_Y(k))$ is Buchsbaum. This in particular implies

(1) *the multiplication map* $H^p(\mathcal{I}_Y(k)) \xrightarrow{x} H^p(\mathcal{I}_Y(k+1))$ *is* 0 *for all* $x \in H^0(\mathcal{O}_{\mathbf{P}^n}(1))$ *and* $1 \leq p \leq \dim Y$.

Conversely, if we have (1) and

(2) *whenever* $H^p(\mathcal{I}_Y(k)) \neq 0 \neq H^q(\mathcal{I}_Y(h))$ *for* $1 \leq p < q \leq \dim Y$, *then* $(p+k) - (q+h) \neq 1$,

then Y is arithmetically Buchsbaum (cf. [**3**]). (Note that (2) is vacuous if $n = 3$.)

The purpose of this note is to announce a structure theorem for arithmetically Buchsbaum subvarieties of codimension 2 satisfying (2). We also give several applications of this theorem, including some inequalities among the number and the degree of the generators of the homogeneous ideal I_Y and the degree of Y, nonexistence of nonsingular codimension 2 Buchsbaum subvarieties satisfying (2), in $\mathbf{P}^n$ for $n \geq 6$, and classification of the nonsingular ones for $n \leq 5$.

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