1067-13-1071 **Lori A McDonnell*** (s-lmcdonn1@math.unl.edu), 3843 S. 48th St. APT 6, Lincoln, NE 68506.

The Second Hilbert Coefficient of a Parameter Ideal in an Unmixed Ring.

In recent work, Ghezzi, Goto, Hong, Ozeki, Phuong, and Vasconcelos showed that an unmixed ring R is Cohen-Macaulay if and only if the first Hilbert coefficient satisfies $e_1(Q) = 0$ for some parameter ideal Q of R. Inspired by this result, we will look at what conclusions can be drawn when the second Hilbert coefficient, $e_2(Q)$, is zero for a parameter ideal Q. In particular, we will discuss the following result:

Theorem Let R be an unmixed Noetherian ring of dimension $d \geq 2$. Suppose that depth $R \geq d-1$ and let Q be a parameter ideal for R. Then the following hold:

1. $e_2(Q) \leq 0$
2. $e_2(Q) = 0$ if and only if $H_Q(n) = P_Q(n)\ \forall n \geq 2-d$ and grade $gr_Q(R)_+ \geq d-1$
3. $e_2(Q) = 0$ implies $e_3(Q) = e_4(Q) = \cdots = e_d(Q) = 0$.

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