1064-13-226 **Lars Winther Christensen**, **David A Jorgensen**, **Hamidreza Rahmati**, **Janet Striuli** and **Roger Wiegand*** (rwiegand@math.unl.edu), 203 Avery Hall, PO Box 880130, Lincoln, NE 68588-0130. *Exact zero divisors and totally acyclic complexes.*

Let $(R, \mathfrak{m}, k)$ be a local ring. A complex

$$\mathbf{F}: \qquad \ldots \to F_{n+1} \to F_n \to F_{n-1} \to \ldots$$

of finitely generated free R-modules is said to be *totally acyclic* provided both $\mathbf{F}$ and $\mathrm{Hom}_R(\mathbf{F}, R)$ are exact. One way such complexes can arise is from a pair of "exact zero divisors", that is, a pair x, y of elements of $\mathfrak{m}$ such that $Rx = (0 :_R y)$ and $Ry = (0 :_R x)$. The complex

$$\cdots \to R \to R \to R \to R \to \ldots \ ,$$

where the maps are alternating multiplications by x and y, is then totally acyclic.

We will discuss the converse: When does the existence of a totally acyclic complex guarantee the existence of a pair of exact zero divisors? More generally, which rings have such pairs? We will focus mainly on the case of Artinian rings. (Received September 09, 2010)