1023-18-1300 **James R. Gillespie*** (jrg21@psu.edu), 4000 University Drive, Penn State McKeesport, McKeesport, PA 15132. *Cotorsion pairs of chain complexes and possible Quillen model structures.* Preliminary report.

A pair of classes $(\mathcal{A}, \mathcal{B})$ in a Grothendieck abelian category is called a cotorsion pair if they are orthogonal with respect to the Ext functor. One interesting feature of cotorsion pairs is their connection with Quillen model category structures on the associated chain complex category. We will see that a single cotorsion pair can potentially give rise to three model structures on the associated chain complex category. As an example, if R is a commutative ring with identity, we have a cotorsion pair $(\mathcal{F}, \mathcal{C})$ where $\mathcal{F}$ is the class of all flat modules and $\mathcal{C}$ is the class of cotorsion modules. This cotorsion pair gives rise to three Quillen model structures on $\mathrm{Ch}(R)$. In one model structure, the cofibrant objects are the dg-flat complexes. In another, the cofibrant objects are the complexes with a flat module in each degree. In the last one, the cofibrant objects are harder to describe, but the fibrant objects are the complexes with a cotorsion module in each degree. We will see a couple general theorems telling us when we get such model structures from a cotorsion pair $(\mathcal{A}, \mathcal{B})$. There is an obvious question that will come up as well. (Received September 25, 2006)