

Dieter Happel **Irreducible maps in derived categories via repetitive categories**

Let Λ be a finite dimensional algebra over a field k . Let $D^b(\Lambda)$ be the derived category of bounded complexes of finitely generated Λ -modules and let $\text{mod } \hat{\Lambda}$ be the repetitive category. It is well-known that $D^b(\Lambda)$ embeds into the stable category $\underline{\text{mod}} \hat{\Lambda}$. The embedding is a functor of triangulated categories. We will discuss the existence of Auslander-Reiten triangles both in $D^b(\Lambda)$ and $\underline{\text{mod}} \hat{\Lambda}$. It is not hard to see that $\underline{\text{mod}} \hat{\Lambda}$ always has Auslander-Reiten triangles, whereas $D^b(\Lambda)$ has Auslander-Reiten triangles if and only if the global dimension of Λ is finite. If $\text{gl.dim } \Lambda = \infty$, then $D^b(\Lambda)$ may have irreducible maps which do not occur in an Auslander-Reiten triangle. The following theorem joint with Keller and Reiten allows to study those.

Theorem: *The embedding $D^b(\Lambda) \rightarrow \underline{\text{mod}} \hat{\Lambda}$ preserves irreducible maps*

We will use this to determine in special cases all irreducible maps in $D^b(\Lambda)$. Moreover this can be used to give a description of the Auslander-Reiten quiver of $D^b(\Lambda)$ in certain cases.

The talks will give an introduction to this topic.