Title: Adjoint preenvelopes and precovers of modules

Author(s): Lixin Mao

Let $\mathcal{C}$ be a class of left R-modules and $(-)^+ = \mathrm{Hom}_{\mathbb{Z}}(-, \mathbb{Q}/\mathbb{Z})$, where $\mathbb{Z}$ is the ring of integers and $\mathbb{Q}$ is the ring of rational numbers. A left R-module homomorphism $M \to N$ is said to be a $\mathcal{C}$-adjoint preenvelope of M if $N \in \mathcal{C}$ and the sequence $0 \to C^+ \otimes M \to C^+ \otimes N$ is exact for any $C \in \mathcal{C}$. $M \to N$ is called a $\mathcal{C}$-adjoint precover of N if $M \in \mathcal{C}$ and the sequence $0 \to N^+ \otimes C \to M^+ \otimes C$ is exact for any $C \in \mathcal{C}$. We investigate the existence and properties of adjoint preenvelopes and adjoint precovers. The relationships among adjoint preenvelopes, adjoint precovers, preenvelopes and precovers are obtained. As a consequence, we characterize several important rings in terms of adjoint preenvelopes and adjoint precovers.

Address:
Lixin Mao
Department of Mathematics
and Physics
Nanjing Institute
of Technology
Nanjing 211167
China