

Decomposition of Modules into Direct Sums of Cyclics

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In this lecture, we will talk about an old question proposed by Köthe in 1935 for the first time:

“For which rings R is it true that every left (or both left and right) R -module is a direct sum of cyclic modules?”.

A ring with this property is called a left Köthe ring (or a Köthe ring). Commutative Köthe rings are exactly the Artinian principal ideal rings but the characterization of non-commutative (left) Köthe rings is still an open problem. In this talk, we will start reviewing some old results on the Köthe problem and after we will turn to study the structure of non commutative Köthe rings whose idempotents are central.