

ON SOME QUESTIONS RELATED TO THE KÖTHE'S  
PROBLEM

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ABSTRACT. The aim of the talk is to discuss the following questions:

- (1) Is the matrix ring over a nil clean ring nil clean?
- (2) When does the set of clean elements of a polynomial ring  $R[x]$  form a subring?
- (3) When is the polynomial ring  $R[x]$  an  $UJ$ -ring (i.e. every unit is of the form  $1 + s$ , for some  $s \in J$ - the Jacobson radical of  $R[x]$ )

In particular it will be shown that the above questions are strongly related to the Köthe's problem and some of their restricted versions are in fact equivalent to it. The talk is based on results obtained in [1,2,3]

References

- [1] P. KANWAR, A. LEROY & J. MATCZUK: *Clean Elements in Polynomial Rings*, Contemporary Math. **634** (2015), <http://dx.doi.org/10.1090/conm/634/12699>;
- [2] M.T. KOŞAN, A. LEROY & J. MATCZUK: *On UJ-rings*, Comm. Algebra, DOI: 10.1080/00927872.2017.1388814;
- [3] J. MATCZUK: *Conjugate (nil) clean rings and Köthe's problem*: J. Alg. and Its App. **16**, No. 4 (2017) 1750073 (14 pages), DOI: 10.1142/S0219498817500736.

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