

Linear Systems Defined over Rings

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Summary

Various linear systems appearing in applications, including systems polynomially characterized by parameters, systems with time delays and many others, can be abstractly described by linear systems over rings, and such systems have been extensively studied for the past two decades. To study such systems the two approaches have been developed, the so-called geometric approach and the transfer matrix approach. This talk will present our recent results on the transfer matrix approach.

In this talk, it is assumed that the underlying ring is restricted to the class of unique factorization domains (UFD's), but this class seems to be large enough to cover linear systems appearing in applications. First, a coprime factorization theory for transfer matrices of systems over a UFD is discussed, and then basic properties of coprime factorizations are presented. Further, various applications of the coprime factorization are presented.