The Transfer Matrix Approach for Linear Systems over Rings

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Summary

Linear systems defined over rings have been studied for the past two decades, and 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 belongs to the class of unique factorization domains (UFD's), but the class of systems over a UFD seems to be large enough to cover systems appearing in applications, including systems polynomially characterized by parameters, systems with time delays and many others. First, a coprime factorization theory for transfer matrices of systems over a UFD is developed, and then basic properties of coprime factorizations are presented. Further, various applications of the coprime factorization are presented.