

Equivalent Circuit Representation of Lossless and Lossy Power Transmission Systems Including Discrete Sampler

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Abstract : In a new smart society supported by the recent development of 5G and 6G Communication systems, the importance of wireless power transmission is increasing. These systems contain discrete sampling systems in the middle of the transmission path and equivalent circuit representation of lossless or lossy power transmission through these systems is an important issue in circuit theory. In this paper, for the given weight function, we show that a lossless power transmission system with the given weight is expressed by an equivalent circuit representation of the Kida's optimal signal prediction system followed by a reactance multi-port circuit behind it. Further, it is shown that, when the system is lossy, the system has an equivalent circuit in the form of connecting a multi-port positive-real circuit behind the Kida's optimal signal prediction system. Also, for the convenience of the reader, in this paper, the equivalent circuit expression of the reactance multi-port circuit and the positive-real multi-port circuit by Cauer and Ohno, whose information is currently being lost even in the world of the Internet.

Keywords : signal prediction, pseudo inverse matrix, artificial intelligence, power transmission

Conference Title : ICSPCN 2022 : International Conference on Signal Processing, Communications and Networking

Conference Location : Tokyo, Japan

Conference Dates : July 21-22, 2022