

## A Neurosymbolic Learning Method for Uplink LTE-A Channel Estimation

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**Abstract :** In this paper we propose a Neurosymbolic Learning System (NLS) as a channel estimator for Long Term Evolution Advanced (LTE-A) uplink. The proposed system main idea based on Neural Network has modules capable of performing bidirectional information transfer between symbolic module and connectionist module. We demonstrate various strengths of the NLS especially the ability to integrate theoretical knowledge (rules) and experiential knowledge (examples), and to make an initial knowledge base (rules) converted into a connectionist network. Also to use empirical knowledge which by learning will have the ability to revise the theoretical knowledge and acquire new one and explain it, and finally the ability to improve the performance of symbolic or connectionist systems. Compared with conventional SC-FDMA channel estimation systems, The performance of NLS in terms of complexity and quality is confirmed by theoretical analysis and simulation and shows that this system can make the channel estimation accuracy improved and bit error rate decreased.

**Keywords :** channel estimation, SC-FDMA, neural network, hybrid system, BER, LTE-A

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