Multidimensional Digital Signal Processing for Printed Circuit Boards Testing

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Abstract:

A new method for multidimensional digital signal processing for Printed Circuit Boards (PCB) testing is described. The considered method comes to solve such problems as competition and synchronization, which are present in the multidimensional signals processing. The solution is achieved by performing in parallel all operations, replacing the analog-to-digital conversion (ADC) with differentiation operations and analyzing the signal variation rate based on the Fuzzy logic elements. As a result of these operations, using digital integration models, binary code streams are obtained that allow the reconstruction of the signal shape. Mathematical models applied for the transformation and processing of multidimensional signals are presented. The designed system for the multidimensional signal processing consists of a computing unit, the test signals generator, the data storage unit, the Printed Circuit Board with nodes for test signals application and retrieval, and finally the processing elements for differentiation and analysis based on Fuzzy logic.