

**Author(S):** Farooq A. Khanday<sup>a</sup>, Costas Psychalinos<sup>b</sup>, Nisar A. Shah<sup>a</sup>  
**Title:** Square-Root-Domain Realization of Single-Cell Architecture of Complex TDCNN  
**Keywords:** Cellular neural network realizations, Continuous-time filtering arrays, Spatiotemporal filtering, Square-root-domain filtering, Analog signal processing  
**Year:** 2013  
**Name of journal:** *Circuits, Systems, and Signal Processing*  
**Volume & Issue** 32(3)  
**Page No:** 959-978  
**Institute:** <sup>a</sup> Department of Electronics and Instrumentation Technology, University of Kashmir, Srinagar, India.  
<sup>b</sup> Department of Physics, Electronics Laboratory, University of Patras, Rio Patras, Greece.

#### Abstract

Square-root-domain (SRD) CMOS analog realization of a single cell architecture of the complex Temporal Derivative Cellular Neural Networks (TDCNNs) is introduced in this paper. TDCNN initiates time derivative 'diffusion' between CNN cells for non-separable spatiotemporal filtering applications, where the input to the CNN is an image that changes over time. The evaluation of the performance of the complex SRD TDCNN cell has been done using the Cadence Orcad software with TSMC 0.18- $\mu\text{m}$  CMOS process model parameters. The provided simulated results confirm the validity of the theory.

**DOI : [10.1007/s00034-012-9503-1](https://doi.org/10.1007/s00034-012-9503-1)**