**A Cellular Network Architecture With Polynomial Weight Functions**

**Abstract:**

 Emulations of cellular nonlinear networks on digital reconﬁgurable hardware are renowned for an efﬁcient computation of massive data, exceeding the accuracy and ﬂexibility of full-custom designs. In this contribution, a digital implementation with polynomial coupling weight functions is proposed for the ﬁrst time, establishing novel ﬁelds of application, e.g., in the medical signal processing and in the solution of partial differential equations. We present an architecture that is capable of processing large-scale networks with a high degree of parallelism, implemented on state-of-the-art ﬁeld-programmable gate arrays.

**Index Terms**—Cellular neural networks, ﬁeld-programmable gate arrays (FPGAs), image processing, partial differential equations (PDEs), system-on-chip.

**TOOLS:**

1. **XilinxISE 14.7**

**LANGUAGE:**

1. **VerilogHDL**