**CONCEPT, DESIGN, AND IMPLEMENTATION OF RECONﬁGURABLE CORDIC**

**Abstract:**

This brief presents the key concept, design strategy, and implementation of reconﬁgurable coordinate rotation digital computer (CORDIC) architectures that can be conﬁgured to operate either for circular or for hyperbolic trajectories in rotation as well as vectoring-modes. It can, therefore, be used to perform all the functions of both circular and hyperbolic CORDIC. We propose three reconﬁgurable CORDIC designs: 1) a reconﬁgurable rotation-mode CORDIC that operates either for circular or for hyperbolic trajectory; 2) a reconﬁgurable vectoring-mode CORDIC for circular and hyperbolic trajectories; and 3) a generalized reconﬁgurable CORDIC that can operate in any of the modes for both circular and hyperbolic trajectories. The reconﬁgurable CORDIC can perform the computation of various trigonometric and exponential functions, logarithms, square-root, and so on of circular and hyperbolic CORDIC using either rotation-mode or vectoring-mode CORDIC in one single circuit. It can be used in digital synchronizers, graphics processors, scientiﬁc calculators, and so on. It offers substantial saving of area complexity over the conventional design for reconﬁgurable applications.

**Index Terms—**Circular trigonometry, coordinate rotation digital computer (CORDIC), hyperbolic trigonometry, reconﬁgurable CORDIC.

**TOOLS:**

1. **XilinxISE 14.7**

**LANGUAGE:**

1. **VerilogHDL**