Cordic Core Specification

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Revision History

Rev.	Date	Author	Description

Combining equation 3 and 7 results in

$$\begin{bmatrix} X_{n+1} \\ Y_{n+1} \end{bmatrix} \cos_n \begin{bmatrix} 1 & S_n 2^{-n} \\ -S_n 2^{-n} & 1 \end{bmatrix} \begin{bmatrix} X_n \\ Y_n \end{bmatrix}$$

$$Z_{n+1} = \sum_{i=0}^{n} \quad (14)$$

For every step of the rotation Sn is computed as a sign of Zn.

$$S_n = \begin{cases} 1 & if\ Z_n \geq 0 \\ -1 & if\ Z_n < 0 \end{cases} \quad (15)$$

Combining equations 5 and 15 results in a system which reduces the not rotated part of angle to zero.

Or in a program-like style:

```
For i=0 to n-1
    If (Z(n) >= 0) then
        Z(n + 1) := Z(n) – atan(1/2^i);
    Else
        Z(n + 1) := Z(n) + atan(1/2^i);
    End if;
End for;
```

The atan(1/2^i) is pre-calculated and stored in a table.

This algorithm is commonly referred to as driving Z to zero. The CORDIC core computes:

3

Polar to Rectangular Conversion

Only CORDIC and CordicPipe are coded so far.

Coming soon.

4

Sine and Cosine calculations

Sine and Cosine can be calculated using the first CORDIC scheme which calculates:

Example:

4.1 Core structure

4.2 IO Ports

Port	Width	Direction	Description