

# Binary Angle Measurement (5A)

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- Adaptive CORDIC
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# BAM Background

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T.K. Rodrigues, "Adaptive CORDIC: Using Parallel Angle Recording to Accelerate Rotations", IEEE Trans on Computers, 2010

# Rotation of 25 degree

## Original CORDIC

$$\begin{aligned} 25^\circ &\approx +45^\circ \\ &\quad -26.565^\circ \\ &\quad +14.036^\circ \\ &\quad -7.125^\circ \\ &\quad -3.576^\circ \\ &\quad +1.79^\circ \\ &\quad +0.895^\circ \\ &\quad +0.448^\circ \\ &\quad +0.2238^\circ \\ \hline &= 25.1268^\circ \end{aligned}$$

## Angle Constants that is used

$$Q = \{45^\circ, 26.565^\circ, 14.036^\circ, 7.125^\circ, 3.576^\circ, 1.79^\circ, 0.895^\circ, 0.448^\circ, 0.2238^\circ\}$$

# Vector Rotation (2)

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# Vector Rotation (3)

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# Successive Rotations

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# CORDIC Rotation

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# $\cos \theta$ in term of $\tan \theta$

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## References

- [1] <http://en.wikipedia.org/>
- [2] CORDIC FAQ, [www.dspguru.com](http://www.dspguru.com)
- [3] R. Andraka, A survey of CORDIC algorithms for FPGA based computers
- [4] J. S. Walther, A Unified Algorithm for Elementary Functions
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- [6] T.K. Rodrigues, "Adaptive CORDIC: Using Parallel Angle Recording to Accelerate Rotations", IEEE Trans on Computers, 2010