

# Binary Angle Measurement (1A)

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- Angle Recording CORDIC
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# BAM Background

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Y. H. Hu, "An Angle Recording Method for CORDIC Algorithm Implementation

# CORDIC Angle Recording Problem

Given  $\{a(i), \text{ for } i = 0, \dots, n-1\}$

angle  $\theta$

Find  $\{u(i) \mid \text{for } i = 0, \dots, n-1, u(i) = 0, +1, -1\}$

such that

$$\theta = \sum_{i=0}^{n-1} u(i) a(i) + \epsilon \text{ for } \epsilon < a(n-1)$$

$$\sum_{i=0}^{n-1} |u(i)| \text{ is minimized}$$

# CORDIC Angle Recording Algorithm

Initialization       $\theta(0) = \theta, u(i) = 0 \ (0 \leq i \leq n-1), k = 0$

Repeat until       $|\theta(k)| < a(n-1)$     Do

1. Choose       $i_k \ (0 \leq i_k \leq n-1)$

$$||\theta(k) - a(i_k)| = \min_{0 \leq i \leq n-1} ||\theta(k) - a(i)|$$

2. Update

$$\theta(k+1) = \theta(k) - u(i_k)a(i_k), \text{ where } u(i_k) = \text{sign}(\theta(k))$$

Greedy Algorithm

## References

- [1] <http://en.wikipedia.org/>
- [2] CORDIC FAQ, [www.dspguru.com](http://www.dspguru.com)
- [3] Y. H. Hu, "An Angle Recording Method for CORDIC Algorithm Implementation"