# Binary Angle Measurement (1A)

- Angle Recording CORDIC
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# BAM Background

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

# CORDIC Angle Recording Problem

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

angle $\theta$

Find $\{u(i)|\ for\ \ i=0,\ \cdots\ ,n-1,\ \ u(i)=0,+1,-1\}$

such that

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

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

# CORDIC Angle Recording Algorithm

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

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

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

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

2. Update

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

Greedy Algorithm

## References

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