Binary Angle Measurement (2A)

- Trellis Search + Extended Elementary Angle Set
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BAM Background

C.-S. Wu, "A High-Performance / Low-Latency Vector Rotational CORDIC Architecture Based on Extended Elementary Angle Set and Trellis-Based Searching Schemes

Extended Elementary Angle Set

EAS (Elementary Angle Set)

$$S_1 = \{\tan^{-1}(\alpha^* \cdot 2^{-s^*}) : \ \alpha^* \in \{-1, 0, 1\}, \ \ s^* \in \{0, 1, \cdots, N-1\}\}$$

EEAS (Extended Elementary Angle Set)

$$S_2 = \{\tan^{-1}(\alpha_0^* \cdot 2^{-s_0^*} + \alpha_1^* \cdot 2^{-s_1^*}) : \ \alpha_0^*, \alpha_1^* \in \{-1, 0, 1\}, \ \ s_0^*, s_1^* \in \{0, 1, \cdots, N-1\}\}$$

Micro-rotation

$$x(j+1) = x(j) - [\alpha_0(j) \cdot 2^{-s_0(j)} + \alpha_1(j) \cdot 2^{-s_1(j)}]\, y(j)$$

$$y(j+1) = y(j) + [\alpha_0(j) \cdot 2^{-s_0(j)} + \alpha_1(j) \cdot 2^{-s_1(j)}]\, x(j)$$

Trellis Based Search Aglorithm

Extended Type-II Scaling

References

[1] http://en.wikipedia.org/
[2] CORDIC FAQ, www.dspguru.com
[3] C.-S. Wu, "A High-Performance / Low-Latency Vector Rotational CORDIC Architecture Based on Extended Elementary Angle Set and Trellis-Based Searching Schemes