Idea (3A)

- Increase CORDIC Precision
- Termination condition
-

Please send corrections (or suggestions) to youngwlim@hotmail.com.

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CORDIC communication pattern
Swapping → 2 Phase clock, multi-phase clock

Communication Computation scheduling
Time division multiplexing
Resource Sharing

Example Area
CORDIC, FFT Butterfly, Encryption, …

Think CORDIC as a search algorithm.

BFS (Breadth First Search)
DFS (Depth First Search)
A*

What is the relationship between “redundant CORDIC algorithm” and this CORDIC search algorithms?

What is the optimal solution in CORDIC?

What can be cost function of search algorithms?

Traditional CORDIC – greedy, Depth First Search

Literature shows this traditional CORDIC is not optimal
At least in the number of iterations.

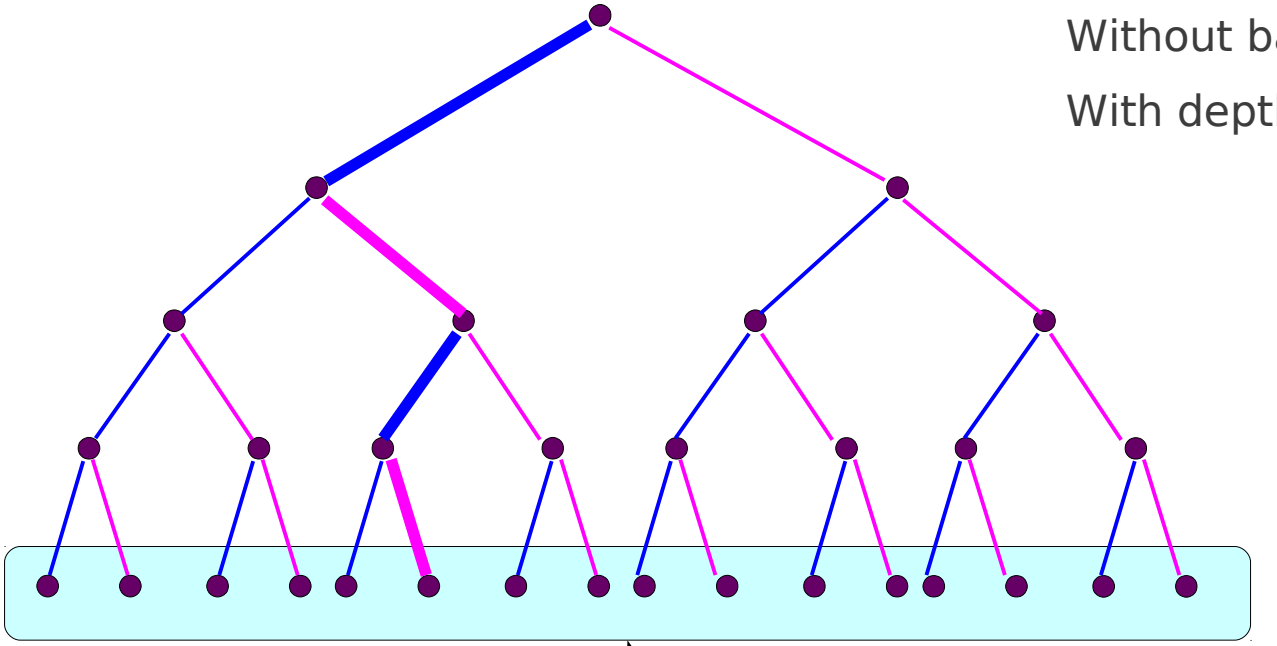
Angle Recording CORDIC
Look Ahead CORDIC

Adaptive CORDIC: Using parallel angle recoding to accelerate CORDIC rotations
[PDF] from utexas.eduTK Rodrigues… - Signals, Systems and …, 2006 – ieeexplore.ieee.org

An angle recording method for CORDIC algorithm implementation
YH Hu… - Computers, IEEE Transactions on, 1993 - ieeexplore.ieee.org

High-performance CORDIC rotation algorithm based on look-ahead techniques
CC Kao - International Journal of Electronics, 2011 - Taylor & Francis

CORDIC as a Search Algorithm



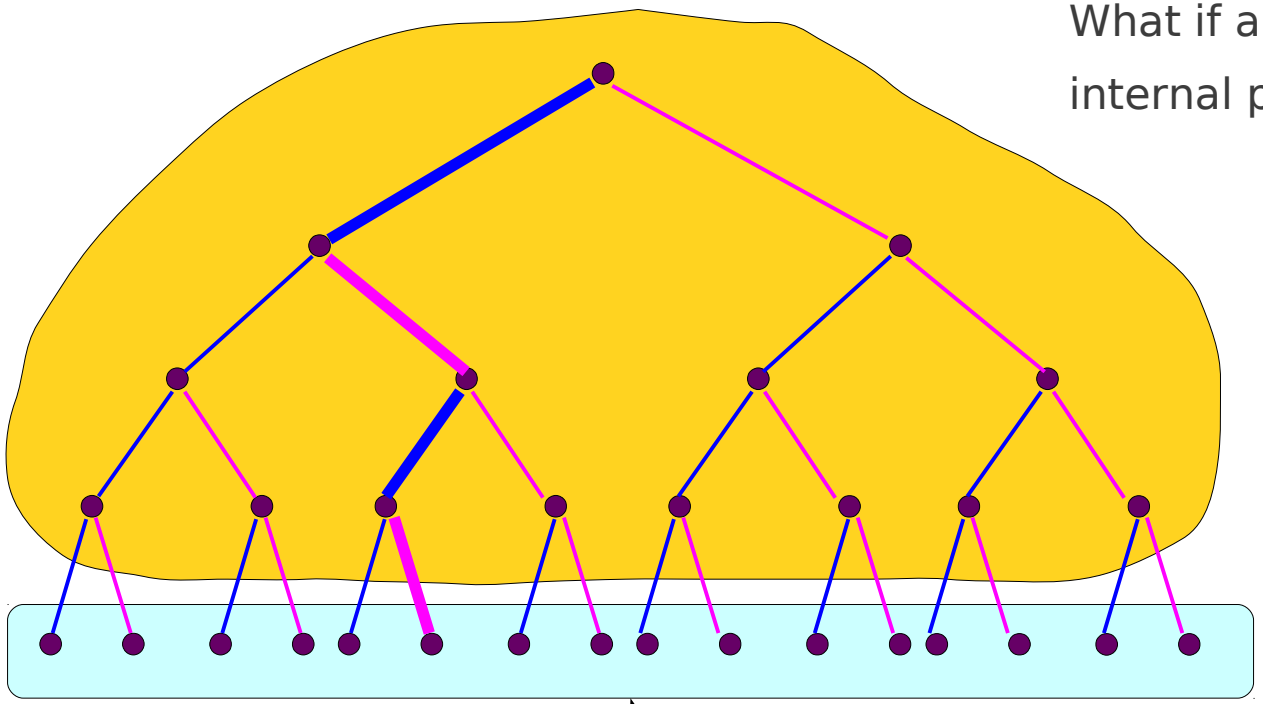
Depth First Search

Without backtracking

With depth bound

Quantized CORDIC Angles

CORDIC as a Search Algorithm



What if angles at these internal points are utilized?

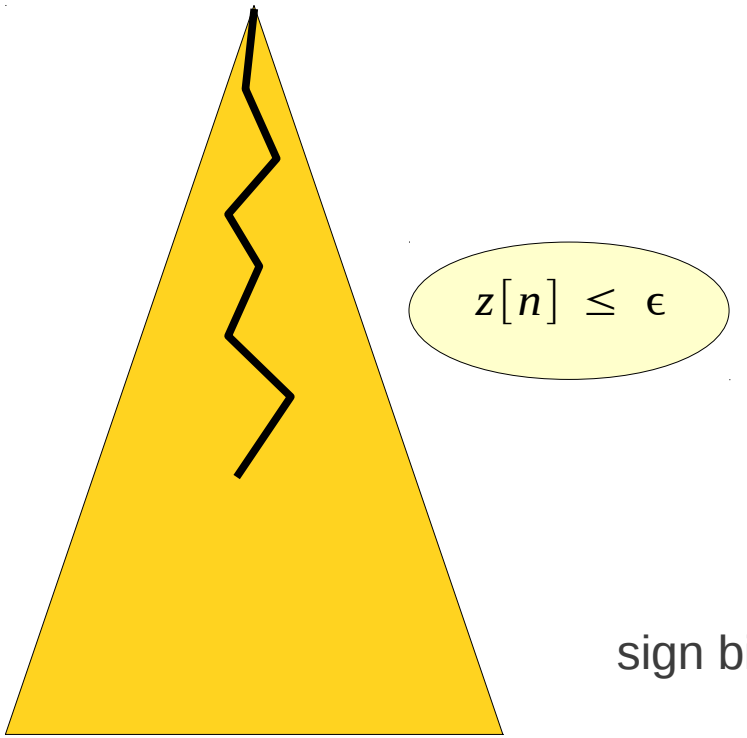
Quantized CORDIC Angles

Find out heuristic functions

To increase precision

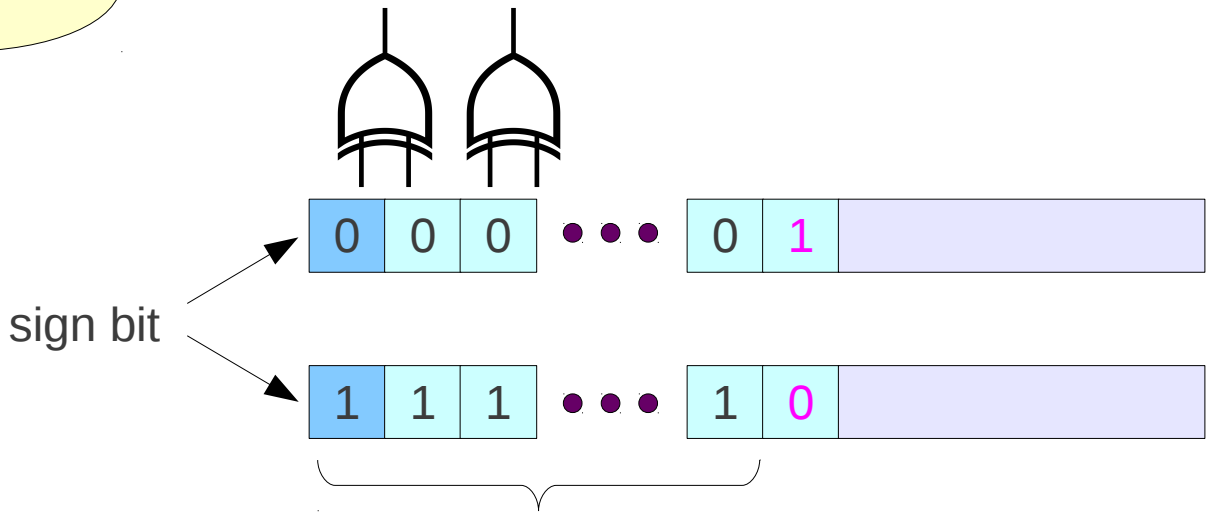
To reduce the number of iterations

Termination Condition



$z[n] \leq \epsilon$

may be implemented
without an additional adder



Need more literature survey
To check if new idea or not

Consecutive sign bits:
Counting leading zero's / one's

References

[1] http://en.wikipedia.org/
[2] J.H. McClellan, et al., Signal Processing First, Pearson Prentice Hall, 2003
[3] A “graphical interpretation” of the DFT and FFT, by Steve Mann