SPRING 2019
ESE 375: Digital Signal Processing Architecture

Instructor: Prof. Sangjin Hong
Office: 201 Light Engineering Building
Office Hours: TuTh 1:30 p.m. - 3:30 p.m.
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Lecture Time and Place

TuTh 3:00p.m. - 5:20p.m. in Room 123 Chemistry Building

Prerequisite

ESE 305 and ESE 380. Students are expected to know the logic design, digital circuits, signals and systems, and some programming. Some background in computer architecture is helpful but not required.

Textbook

VLSI Digital Signal Processing Systems: Design and Implementation, K. K. Parhi. Wiley and Sons, 1999

Course Goals

This course covers various aspects of architectures in digital signal processing and multimedia data processing. The topics include iteration bound analysis, retiming the circuits, unfolding and folding the architectures, algorithmic and numerical strength reduction for low power and low complexity design, introduction to array processor architectures and CORDIC implementation.

Project

This is a project-oriented course. No specific lab times are scheduled, and you can work at your convenience.

Course Contents

Week 1: Course Overview, Circuits and Systems
Week 2: Algorithm Representation
Week 3: Iteration Bound and Analysis
Week 4: Retiming, Clock Minimization
Week 5: Register Minimization, Complexity Reduction
Week 6: Unfolding, Parallelization
Week 7: Folding, Bit Serial Architecture

Week 8: Folding, Complexity Reduction
Week 9: Numerical Strength Reduction, CSD
Week 10: Array Processor, Systolic Architecture
Week 11: 3-D Systolic Architecture
Week 12: Algorithm Strength Reduction
Week 13: Scaling and Round-Off Noise
Week 14: Advanced Topics

Grading

The grading will be based upon:
(1) 6 Homework Assignments (20%)
(2) 1 Project (30%)
(3) 2 Midterm Exams (50%)

Blackboard

You can access class information on-line at: http://blackboard.stonybrook.edu
For help see: http://it.stonybrook.edu/services/blackboard
For problems logging in, go to the helpdesk in the Main Library SINC Site or the Union SINC Site; you can also call: 631-632-9602 or e-mail: helpme@stonybrook.edu

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