DRAFT FOR HARDWARE/SOFTWARE CODESIGN SEMINAR:

TOPIC : ANT COLONY OPTIMIZATION

1. INTRODUCTION
   - Definition of the algorithm
   - Swarm Intelligence and biological origins.
2. DYNAMIC ANT ALGORITHM
   - Decision path
   - Decision graph
   - Construction of a decision path
   - State transition rule
   - Path exploration.
3. HIGH LEVELSYNTHESIS IN RELATION TO ANT COLONY OPTIMIZATION(ACO).
   - High Level Synthesis flow
   - High Level Synthesis formulation
   - High Level Synthesis complexity
4. HACO-F : AN ACCELERATING HLS BASED FLOATING ANT COLONY OPTIMIZATION ON FPGA.
   - Data optimization
   - Loop optimization
   - HACO design based on HLS
   - HACO-F data optimization design
   - HACO-F loop optimization.

5. Ant colony optimization algorithm for fuzzy controller and design of its FPGA.

- Basic concepts of FC and ACO
- The ith rule
- FC design by ACO
- Hardware implementation of ACO in ACO-FC.

- Keinprasit, Rachaporn, and Prabhas Chongstitvatana. "High-level synthesis by dynamic ant." *International journal of intelligent systems* 19.1-2 (2004): 25-38.
- E. Torbey and J. Knight, "High-level synthesis of digital circuits using genetic algorithms," 1998 IEEE International Conference on Evolutionary Computation Proceedings. IEEE World Congress on Computational Intelligence (Cat. No.98TH8360), 1998, pp. 224-229, doi: 10.1109/ICEC.1998.699505.
- . M. Dorigo and L. M. Gambardella, “Ant colony system: a cooperative learning approach to the traveling salesman problem,” IEEE Transactions on Evolutionary Computation, vol. 1, no. 1, pp. 53-66, April 1997

- C. F. Juang, C. M. Lu, C. Lo, and C. Y. Wang, “Ant Colony Optimization Algorithm for Fuzzy Controller Design and Its FPGA Implementation,” IEEE Transactions on Industrial Electronics, vol. 55, no. 3, pp. 1453-1462, March 2008
- Zhang, Shuo, et al. "HACO-F: An Accelerating HLS-Based Floating-Point Ant Colony Optimization Algorithm on FPGA." *International Journal of Performability Engineering* 13.6 (2017).