



COLLEGE OF ENGINEERING & TECHNOLOGY

Department: Electronics and Communications Engineering, Cairo

Graduation Project Description Form

Project Title: Adaptive Beamforming for Interference Mitigation in Wireless Communication Systems

Duration from mo/year ____ till mo/year ____

Project Supervisor(s): Associate professor Dr. Hussein Hamed Ghouz

Associate professor Dr. Kairy al-Barbary

Product Category

Algorithm ____ Hardware ____ Software ____

Standards:

Safety: UL, CE ____ IEEE ____ FCC ____ Other ____

Practical Realization Form

PCB ____ Firmware ____ Embedded CPU Kit (ARM, ..etc): ____

PC Software ____ Ready-made Package ____ DSP Kit ____ FPGA Kit ____

VLSI Schematics ____ VLSI Layout ____ VLSI Silicon (ASIC) ____

Language

VHDL/Verilog ____ Matlab ____ C/C++/Java ____

Productization

Finished Product Form: ____ Possible Commercialization ____

Amount of funds needed for buying components: ____

IEEE GOLD Made-In-Egypt/Engineering Day: ____

ITAC (ITIDA) or NTRA Funding Application: ____

Testing

Functional ____ Simulation ____ Parameters ____ Final Hardware ____ Other: ____

Lab Test Setup

EMC ____ Environmental ____ Microwave ____ Analog Lab ____ Other: ____

CAD Tools (No unauthentic software is allowed):

Elective Classes Required:



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Abstract

Adaptive beamforming is one of major signal processing techniques used for interferences mitigation in wireless communication systems. The adaptive algorithm used in this technique is mainly based on the specific application. In this project the student simulate the basic operation of adaptive beamforming using the Matlab software package. First, the students review the different types of phased array antennas as well as the main adaptive algorithms. Second, the students select one application to apply the concept of adaptive beamforming.

Required Number of Students: Four

Recommended Applications:

Pulse Doppler radar system – Mobile communication System

Project Plane:

The first semester:

1. Review the different types of phased array antennas
2. Review the different types of adaptive algorithms
3. Learn the Matlab

The second semester:

1. Select one application and study in details the system parameters
2. Using the Matlab simulate the following:
 - a. System operation including signal and noise
 - b. Interference parameters
3. Evaluate the output SNIR from the phased array antenna and compute the improvement factor



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References and Links