

Graduation Project Proposal

Broadband Chirp Signals for Advanced Communications and Cognitive Radio Systems

Supervised by

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Future communications are characterized by very high data rates and require the transmission of broadband signals. Due to the scarcity of spectrum, Cognitive Radio (CR) has been recently suggested as an important future communication technology. One of the main requirements of CR communications is the intelligent adaptation of the signal parameters such that an unlicensed secondary user can access licensed spectrum and utilize vacant channels without interfering with the primary users.

The project aims to study the main concepts of the design of broadband signals based on Chirp technology with linear and nonlinear frequency sweeps for future communications and cognitive radio systems with emphasis on;

- 1- CR basics and standards.
- 2- Generation, modulation and multiple access techniques of Chirp signals.
- 3- Applications of Chirp signals in modern radar and communication systems.
- 4- Narrowband and wideband interference rejection using chirp signals.
- 5- Use of Frequency Hopping techniques to improve the performance of chirp signals in Cognitive radio applications.
- 6- Further applications of chirp signals in advanced communication systems.

The project methodology relies mainly on MATLAB simulations. Also, some practical implementations are optional, depending on the availability of supporting funds.