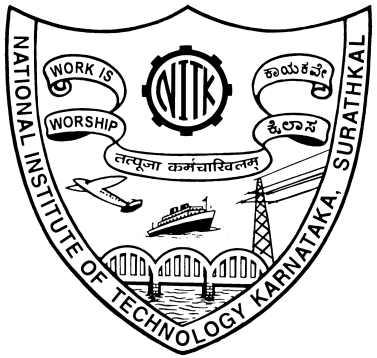
Assignment-1



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Questions

1. Explain the significance of pulse compression with the help of a real example and using RRE demonstrate that it is enhancing the performance of SNR.
2. Explain CW and FMCW radars and its micro Doppler applications.
3. Explain the significance of poly phase codes and generate P=3,4,5,6,7, and 8 length Frank codes.
4. Compare and contrast at least three airborne radar applications with the help of their specifications and how pulse compression plays a major role in improving the performance.

Problems on LFM

1. A radar's pulses each uses linear FM of 8.5 MHz over a duration of 10 micro second. What is the systems compression ratio? What is the pulses duration at the output of the pulse compression filter? Further, repeat the problem for a frequency sweep of 24 MHz in an 8 micro send pulse.
2. The pulse duration of the linear FM matched filter is 0.5 micro second. The transmitted pulse duration is 200 micro second? What frequency deviation must the transmitted pulse have? Find the waveforms time bandwidth product.
3. A linear FM pulse is centered on the time origin. Find the rms duration of the signals complex envelope.

Problems on Binary Phase Codded Waveforms

1. Evaluate the aperiodic autocorrelation for all the Barker codes listed in the PPT up to length 13.
2. Generate binary complementary pairs up to length 256 and see the sum of ACF is coming to desired value up a length of 16.
3. list out all combinations of binary codes up a length of 6 (i.e.,2^6). identify Barker codes in them. Also find are there any near Barker codes are present in the group of sequences?