Abstract

Sequences with good correlation properties are in general required in various applications such as radar, sonar, spread spectrum and multiple access communication. The optimal sequences are the ones whose peak sidelobe of the aperiodic autocorrelation function is the minimum possible for a given sequence length. A chaotic sequence that provides auto and cross-correlation properties that are similar to those of random white noise is used for radar and spread spectrum systems. This paper presents a novel method of generating four phase codes applicable for radar pulse compression, which is derived from chaotic maps. It is also feasible to achieve simultaneously superior performances in detection range and range resolution using the proposed four phase coded sequences. The properties of these sequences like autocorrelation function, ambiguity function, Peak Sidelobe Ratio (PSR) and Integrated Sidelobe Ratio (ISR) have been studied. The properties of the codes generated by chaotic mapping method are very similar to those of the random four phase codes. The generation of these sequences is very simple, the available number of sequences is virtually infinite and number of sequences generated is not limited by the length of sequence.
Fourphase Pulse Compression Sequences Generated using Chaotic Maps

References

- Hilborn, R. C., 1994, Chaos and Nonlinear Dynamics: An Introduction for Scientists and
Index Terms

Computer Science

Wireless Communications

Keywords

Pulse Compression Peak Sidelobe Ratio Integrated Sidelobe Ratio Chaotic Map