

THE SOME PROBLEMS OF RADAR SHORT PULSE DIGITAL PROCESSING

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The use of digital processing the radar short pulse due to its short duration is connected with some technical difficulties. In order to increase the efficiency of the radar short pulse detection under digital processing it is proposed to realize the coordinated addition of ADC-counts. This addition must be adaptive concerning the signal delay time. Herewith the duration of summing sample of counts must change concerning the detection distance to save the required detection characteristics. The high-precision selection of signals according to their arrival time may be accomplished as a consequence the ADC-counts quantity along the signal duration. This quantity must be not less than four per pulse.

This report describes the determined algorithms for the measurement of one pulse time delay oriented on the trigonometrical approximation for Gausse's model of the pulse envelope. It is given their comparison with a modified Prony's method. The advantage of the proposed method in the case of the crossing pulses quantity consists in the lesser number of ADC-counts than their are need by use of Prony's method for exponential signal model.

For the case of the crossing pulses quantity on an example of the \sin^M -approximation radar short pulse the behavior of potential accuracy of measurement is investigated in dependence on pulse duration in ADC-counts and signal quantity. In order to find the lower Cramer-Rao boundary the original Face-Splitting Matrix Product was worked out by author.