

# The Results of the Modeling and Estimate of the Characteristics of the Signals with Linear Frequency Modulation Reflected from the Spread Objects

S. B. Medvedev, V. I. Shaposhnikov<sup>1</sup>, O. A. Chekmazova

<sup>1</sup>*candidate of engineering science, Joint-Stock Company "Research Institute of Precision Instruments"*

*e-mail: v.schaposchnikov@yandex.ru, alter-vista@mail.ru*

**Abstract.** The article contains the study of the algorithms of the weight impulse-type signal processing with linear frequency modulation in the radio engineering measurement system of parameters relative to the movement used for space vehicles docking. The aim of work is to increase the system working capacity due to eliminating the spurious signals reflected from the large-sized construction elements, for example from the International Space Station. Such spurious signals are received in the same time interval together with the useful signal that contains the data on the relative movement parameters. This can reduce the measurement accuracy of these parameters. In order to eliminate this effect, there was selected an broadband impulse signal with linear frequency modulation and digital processing of the received signal. Deterioration of the measurement accuracy caused by the sidelobes of the correlation function leads to the necessity to examine different ways of their reducing with the help of so called "mismatched reception" which has a distinctive feature of losses caused by the discrepancy. This work contains the research on measuring these losses depending upon the relation  $F_{KV}/F_{DEV} = K$ . Moreover, the best value of K when using this filter was found.

**Keywords:** space vehicles docking, linear frequency modulation, multipath effect, mismatched filtering, deviation frequency, sampling frequency