

Construction of non-redundant antenna configurations on square and hexagonal grids of a large size

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Abstract A regular method is applied to search for the maximum-element non-redundant configuration on a square or hexagonal grid of large size. The method is based on using special type sequences, namely, planar difference sets; it automatically ensures non-redundancy of the configuration obtained on a 2-D grid thus saving the computation time that is important when dealing with great element numbers. Usage of this method enables one to simulate a non-redundant antenna arrangement on the aperture of a large-sized 2-D interferometer. Such a simulation for integer square grids with the sidelengths up to 150 and for hexagonal ones having radii from 15 up to 75 was carried out, and the maximum numbers of the configuration elements obtained in such a way are presented.

Keywords Interferometers · Antenna configuration · Non-redundant configuration · Square grid · Hexagonal grid · Planar difference set

1 Introduction

Currently, usage of large-sized interferometers with the non-redundant arrangement of the antenna elements is topical for astronomical imaging applications, for i.e. improving spread function (and obtaining better side lobe rejection). In this connection, the problem arises of constructing the non-redundant configuration (NRC) with maximum possible element number.

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