Referee report on the paper "Application of array-matrix spaces to determine new conditions for vector-valued DFT" by Huan Pablo Soto Quirós, submitted to Linear Algebra and its Applications.

The paper describes sufficient conditions for the the vector-value DFT being invertible, using so-called array-matrix spaces.

The paper makes a very strange impression. The author clearly is an outsider to the linear algebra community: he spends quite a lot of time describing trivialities (like the definition of the DFT, Hadamard product), but he does not explain in the details the terminology that is not common to the readers of the LAA (CAZAC, vector-valued ambiguity functions, etc.). This is however is not the main concern.

Let us look more closely on the actual results of the paper. The main tool the author uses is the "array-matrix" space. This is defined as a matrix with vectors as elements, and this is clearly a **standard definition of block matrices**:

`http://en.wikipedia.org/wiki/Block_matrix`

with the block size $D \times 1$.

They can be also stored as D matrices of size $M \times N$ (the author calls them "generator sets"). Then the author defines a multiplication of "array-matrices", which is equivalent to the multiplication of generator matrices (i.e., multiplication of block-diagonal matrices comprised from A_k).

This extremely simple fact is presented in a rather obscure way, with tons of examples for no reason. Finally, "a new theorem" is proved, which in standard terms is: that the inversion of block diagonal matrices is equivalent to the inversion of each block.

Finally, the author goes to the discussion of the vector valued DFT (which is just the application of the DFT to D different vectors). These results also do not have anything interesting and new.

The problem is basically in the notation: the author gets overwhelmed with different definitions and does not see trivial algebraic facts behind them.

I think that the paper should be rejected.