Weekly Report

OBJECTIVE

Be familiar with the imaging generation process on real data and calculate the running time on each step.

PROCEDURE

1. Loading ASKAP.ms data and create visibility by calling *create_blockvisibility_from_ms* function.
2. Getting a model from visibility by calling *create_image_from_visibility* function.
3. Getting dirty image by calling *invert_ng* function.
4. Exporting dirty image as .fits files.
5. Visualize the .fits files.

RESULT

Visualization

For dirty image and PSF image, the image data is four-dimensional data - (1024, 1024, 1, 192). Randomly choose the fourth dimension and plot it.

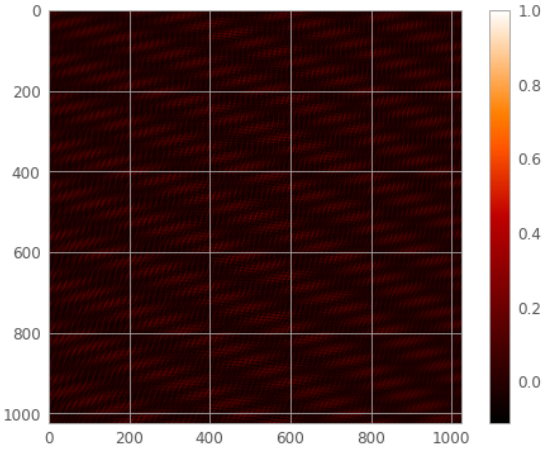

Figure 1 psf image

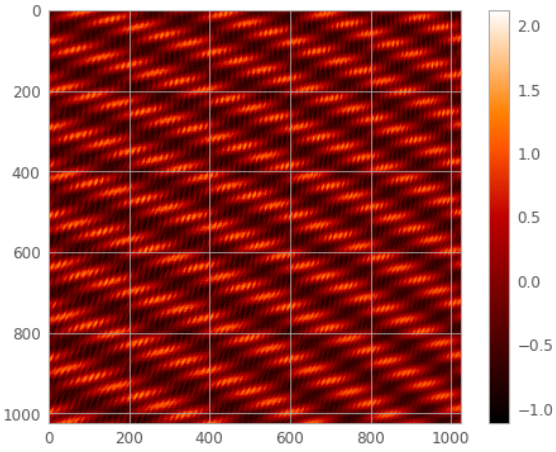

Figure 2 dirty image

Time Analysis

CBFM, CIFV, INP, INF denotes *create_blockvisibility_from_ms, create_image_from_visibility,* preprocess part of *invert_ng* and FFT part of *invert_ng* respectively.

API	*CBFM*	*CIFV*	*INP*	*INF*
Time	0.12s	0.003s	0.6s	15min

PROBLEMS & CONFUSION

1. I wanted to run ska_imaging_rsexecute_pipeline.py (path: */rascil/examples/pipelines/ska-pipelines*). It seems need to log in and I failed to log in.
2. I do not know to set parameters in *create_image_from_visibility* like *cellsize* and *polarisation_frame*. I just simply set the values same as those in *ska_imaging_rsexecute_pipeline.py*.
3. In *invert_ng*, it uses *nifty gridder* package to implement gridding whose main function is Fourier Transform, precisely Non-Uniform Fast Fourier Transform. https://arxiv.org/abs/1808.06736, this is the paper illustrated the concrete content. In this paper, I found NFFT is the acronym of **Nonequispaced Fast Fourier Transform** which is commonly used in imaging and popular. However, Nonlinear Fourier Transform is commonly

used in optical transmission now and not popular. So, what we need to do is to implement it and do comparison with NUFFT and NFFT?

4. How can I know the images we generated are correct?

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