TITLE

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ABSTRACT

***Index Terms*—**

1. INTRODUCTION

2. SIMULATED IMAGES

We build the simulated images $800 \times 800 \times 3$ two-classes phantom images, the third dimensions is a channel number. Into the image, we insert a rectangle centered in the pixel $(400, 400)$ and defined below. One class we define like outside of the rectangle, and another class is inside. The classes are Wishart distributions with $L = 4$, μ_1 and μ_2.

In the edge of the rectangle, we define a variable ϵ to both sides. This manner built a strip around the rectangle edges, inside this strip we using the same L and the μ is arithmetic average between μ_1 and μ_2.

We insert the samples under a base image built like:

(i) To put zeros in the image 800×800.

(ii) Into to the rectangle $[x_i + \epsilon, y_i + \epsilon] \times [x_u - \epsilon, y_u - \epsilon]$ set the value pixel 1. Where:

   (a) x_i Lower horizontal coordinate.

   (b) y_i Lower vertical coordinate.

   (c) x_u Upper horizontal coordinate.

   (d) y_u Upper vertical coordinate.

   (e) ϵ Adjustment constant.

(iii) In the horizontal strips $[x_i + \epsilon, y_i - \epsilon] \times [x_u - \epsilon, y_i + \epsilon]$, and $[x_i + \epsilon, y_u - \epsilon] \times [x_u - \epsilon, y_u + \epsilon]$, we define like below functions.

(iv) In the vertical strips $[x_i - \epsilon, y_i + \epsilon] \times [x_i + \epsilon, y_u - \epsilon]$, and $[x_u - \epsilon, y_u + \epsilon] \times [x_u + \epsilon, y_u - \epsilon]$, we define like below functions.

(v) In the corner, we using the functions.

The function for the horizontal strips is:

$$f_x(x) = \begin{cases} 0 & \text{if } x < 0 \\ 6x^5 - 15x^4 + 10x^3 & \text{if } 0 \leq x \leq 1 \\ 1 & \text{if } x > 1. \end{cases}$$

The function for the vertical strips is:

$$f_y(y) = \begin{cases} 0 & \text{if } y < 0 \\ 6y^5 - 15y^4 + 10y^3 & \text{if } 0 \leq y \leq 1 \\ 1 & \text{if } y > 1. \end{cases}$$

The function for the corners is:

$$f(x, y) = \begin{cases} 0 & \text{if } x, y < 0 \\ f_x(x) f_y(y) & \text{if } 0 \leq x, y \leq 1 \\ 1 & \text{if } x, y > 1. \end{cases}$$

The idea to built the simulated image was based in [1] and the parameters μ_i also.

With base in the figure above and [1], we define the samples distributed as Wishart, where L, μ_1, μ_2, and $\mu_{av} = (\mu_1 + \mu_2)/2$ in all channels. We use μ_{av} to strip in the image.

To each channel n_i the parameters are:

(i) $\mu_1 = 0.042811$, $\mu_2 = 0.014380$

(ii) $\mu_1 = 0.035977$, $\mu_2 = 0.002789$

(iii) $\mu_1 = 0.066498$, $\mu_2 = 0.015387$

3. REFERENCES

[1] L. Gomez, L. Alvarez, L. Mazorra, and A. C. Frery, "Fully PolSAR image classification using machine learning techniques and reaction-diffusion systems," *Neurocomputing*, vol. 255, pp. 52–60, 2017.

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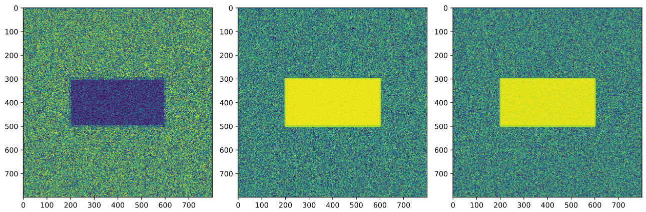
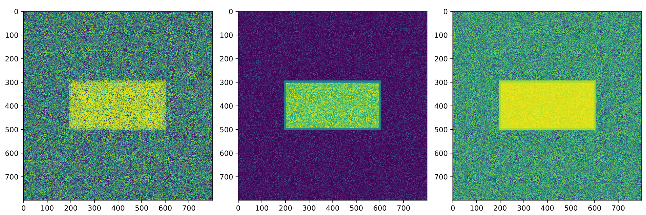


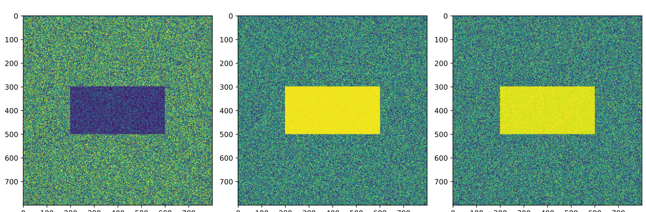
(a) Red channel (b) Green channel (c) Blue channel

Fig. 1. Pauli decomposition to simulated image with μ_1 greater than μ_2 and smooth ramp



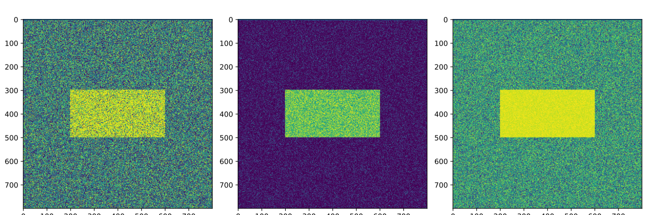
(a) Red channel (b) Green channel (c) Blue channel

Fig. 2. Pauli decomposition to simulated image with μ_1 less than μ_2 and smooth ramp



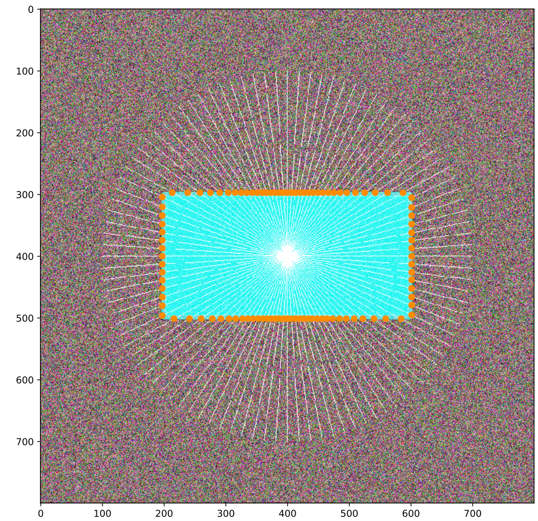
(a) Red channel (b) Green channel (c) Blue channel

Fig. 3. Pauli decomposition to simulated image with μ_1 greater than μ_2

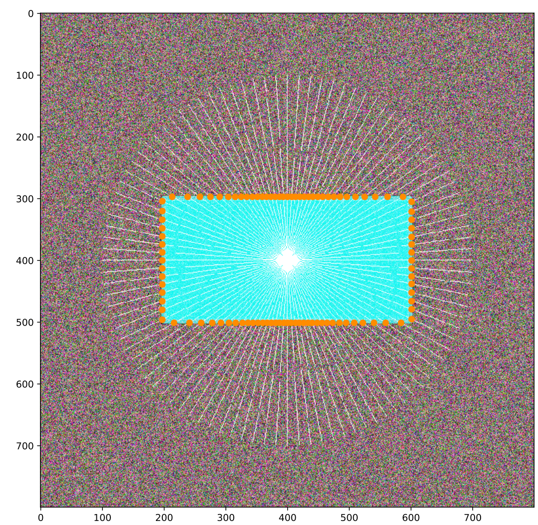


(a) Red channel (b) Green channel (c) Blue channel

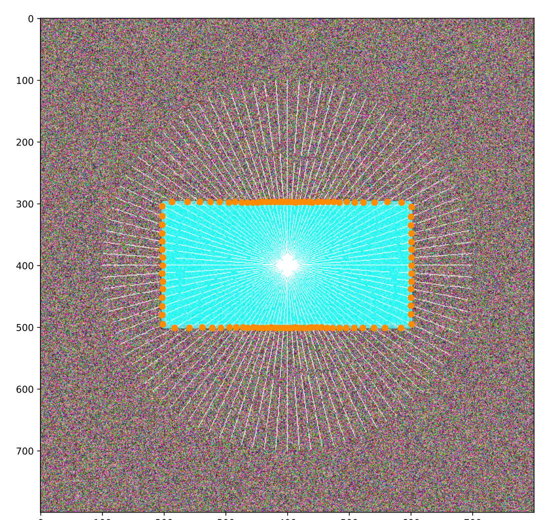
Fig. 4. Pauli decomposition to simulated image with μ_1 less than μ_2



(a) Channel hh

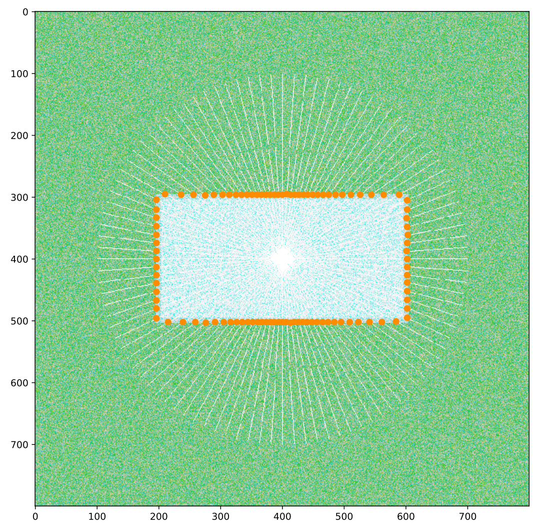


(b) Channel hv

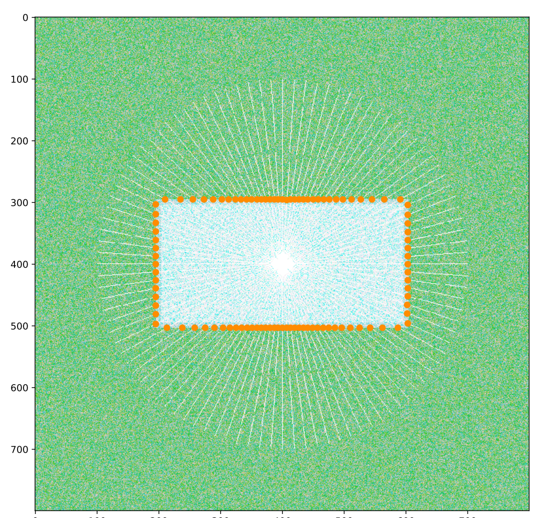


(c) Channel vv

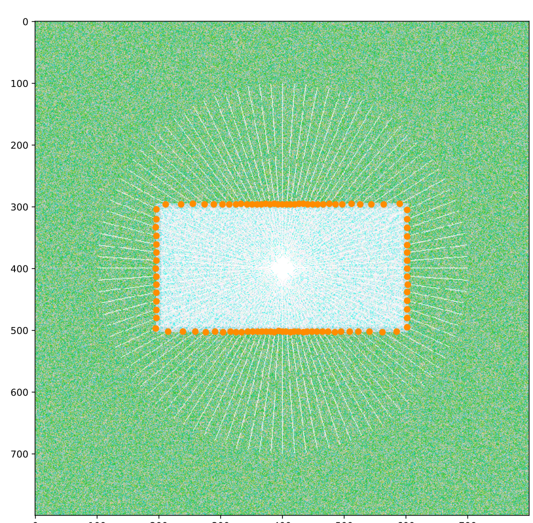
Fig. 5. Evidences in hh channel to simulated image with μ_1 greater than μ_2 and smooth ramp



(a) Channel hh

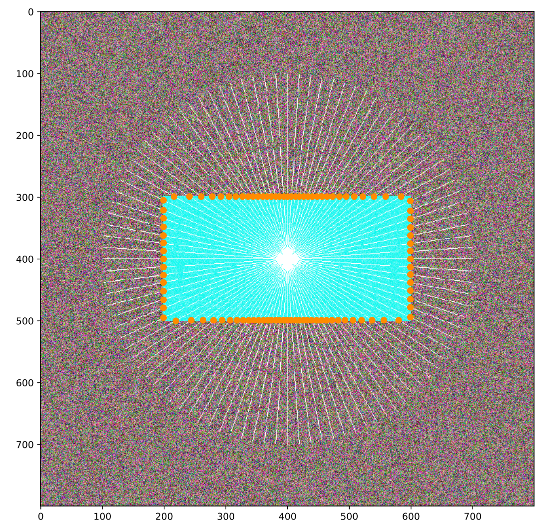


(b) Channel hv

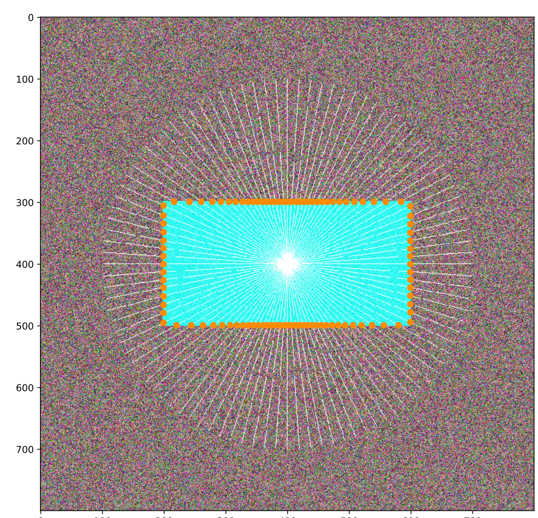


(c) Channel vv

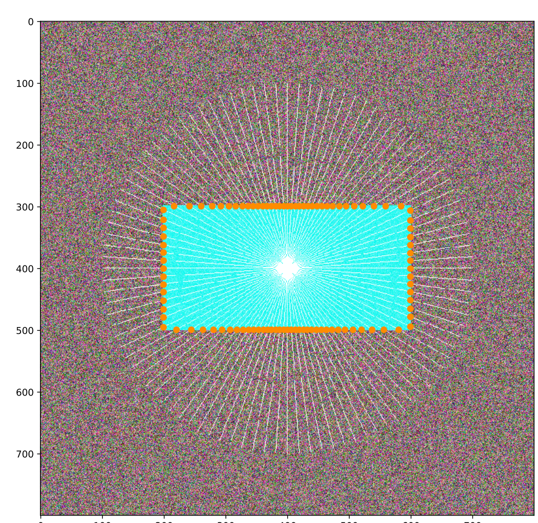
Fig. 6. Evidences in hh channel to simulated image with μ_1 less than μ_2 and smooth ramp



(a) Channel hh

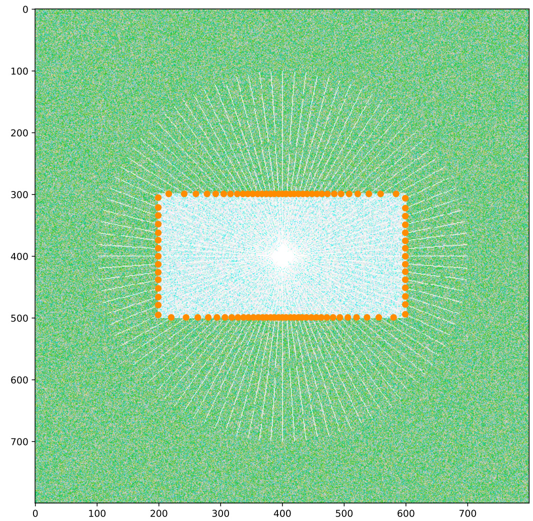


(b) Channel hv

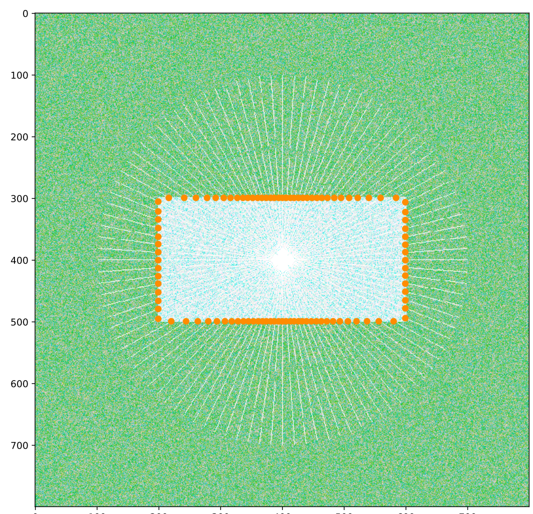


(c) Channel vv

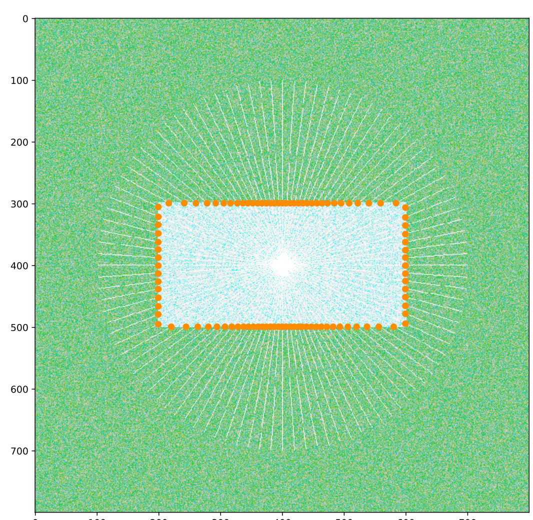
Fig. 7. Evidences in hh channel to simulated image with μ_1 greater than μ_2



(a) Channel hh



(b) Channel hv



(c) Channel vv

Fig. 8. Evidences in hh channel to simulated image with μ_1 less than μ_2