columns of the image and then applied to the rows. For the image size of N1 rows and N2 columns, applying the 1D analysis filter bank to each row of both of the two sub-band images, we have four sub-band images, each having N1/2 rows and N2/2 columns.

In this paper we present an example for two dimensional (2-D) discrete wavelet transform of a signal x is implemented by iterating the 2D analysis filter bank on the low pass sub-band image. In this case, at each scale there are three sub-bands instead of one. We create a random input signal x of size 128 by 64. We apply the DWT and its inverse, and show its reconstruction x from the wavelet coefficients. The three wavelets associated with the 2D wavelet transform are shown in figure 3 .

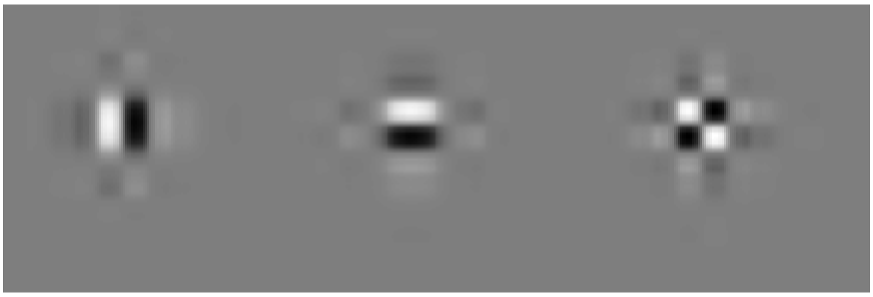

Figure 3: The three wavelets associated with the 2D wavelet transform

2.7 Kriging Method Of Image Interpolation

Generally during interpolation the value at the unknown location is found out by an algorithm which calculates the value of the given unknown (variable) as a weighted sum of the surrounding variables at their locations respectively. But this is not a very efficient way of predicting the unknowns the value may not be predicted properly in case the neighboring variables are placed in a few clusters which are placed far away from each other. However Kriging predicts these values in a rather more optimal and accurate way using the concept of weighted average from a data-driven weighting function in contrast to, the other image interpolation methods which use an arbitrary value for the weighting function. Kriging confer weights for each point according to its distance from the unknown value. Kriging interpolation can be carried out using the following set of equations:

$$Z(X) = m(X) + \varepsilon'(X) + \varepsilon'' \qquad (12)$$

In the above equation m(x) is a function which describes the structural or surface component of the image which is being investigated and $\varepsilon'(x)$ be a function which describes the probability distribution if a random sequence obtained on the basis of autocorrelation of the unknowns in the image; ε'' is the term which indicates the random noise generated in the image, whose mean value is 0 and variance is σ_2.

$$E[Z(X)-z(x+h)]=0 \qquad (13)$$

M(x) is a function which helps in determining the trend over that particular region of the image. For example: if we take the case of a uniformly distributed image then, the difference between x and (x + h) would be 0 (h) being the distance between the two points. This also means that if the difference between the two points is less, then they will also have almost similar values.

$$E[\{ Z(x) - Z(X+h)\}_2] = E[\{\varepsilon'(x)- \varepsilon'(X+h)\}_2] = 2\,\Upsilon(h) \quad (14)$$

Where $\Upsilon(h)$ is defined as the *semi variance*. Taking all this into account the above original equation 1 can also be expressed as:

$$Z(X) = m(x)+ \Upsilon(h) + \varepsilon' \qquad (15)$$

Here we present the Kriging interpolation on random filed with sampling locations. figure 6 (a) shows the random field with sampling locations. The kriging predictions, variogram and Kriging variance are shown in figure 4 (b)-(d) respectively.

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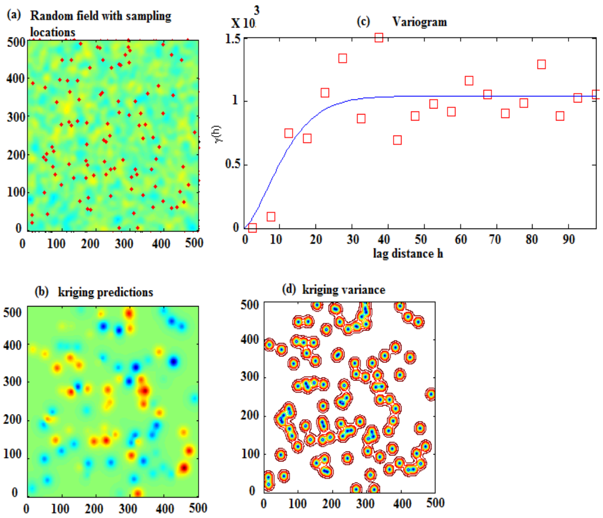

Figure 4 (a) Random field with sampling location (b) kriging predictions (c) variogram (d) kriging variance

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