**In this document, the main files related to denosing in wavelet domain using 2D-GARCH models are described**

1. **Denoising in wavelet domain**

**1.1. Denoising using 2D-GARCH model**

**Denoising using 2D-GARCH model use “denoisingun\_mean”**

**Used in section 3-1-2, 4-1**

[x,x1,a1,a2,bA2x,bH2x,bV2x,bD2x,bH1x,bV1x,bD1x]=denoisingun\_mean(y,p1,p2,q1,q2,wv );

* Inputs:
  + y:noisy image
  + p1,p2,q1,q2: degree of 2D-GARCH model
  + wv:wavelet type such as ‘db4’, ….
* Important Outputs:
* x:denoised images (denosing approximation subband too)
* x1: :denoised images (not denosing approximation subband)

\*Note: for reducing multiplicative noise first use log transform and then above function

**1.2 Denoising using 2D-GARCH mixture model**

**Denoising using 2D-GARCH mixture model use “denoisingun\_mean\_mixture”**

**Used in sections 4-2, 4-5-1 of book**

[x,x1,a1,a2]=denoisingun\_mean\_mixture(y,p1,p2,q1,q2,wv );

* Inputs:
  + y:noisy image
  + p1,p2,q1,q2: degree of 2D-GARCH models in mixture model usually 1,1,1,1
  + wv:wavelet type such as ‘db4’, ….
* Important Outputs:
* x:denoised images (denosing approximation subband too)
* x1: :denoised images (not denosing approximation subband)

\*Note: for reducing multiplicative noise first use log transform and then above function

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**1.3 Denoising using 2D-GARCH-GG model**

**Denosing using 2D-GARCH generalized Gaussian (2D-GARCH-GG) model use “denoisingun\_GG\_mean”**

[x,x1,a1,a2]=denoisingun\_GG\_mean(y,p1,p2,q1,q2,wv );

* Inputs:
  + y:noisy image
  + p1,p2,q1,q2: degree of 2D-GARCH models in mixture model usually 1,1,1,1
  + wv:wavelet type such as ‘db4’, ….
* Important Outputs:
* x:denoised images (denosing approximation subband too)
* x1: :denoised images (not denosing approximation subband)

\*Note: for reducing multiplicative noise first use log transform and then above function