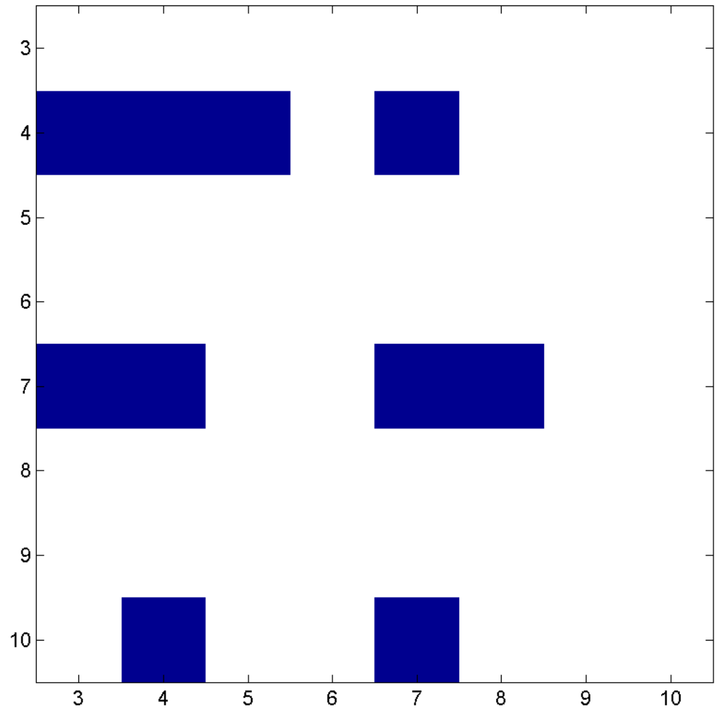
I summarize the first attempt to find the instrument polarization, assuming Mars is unpolarized. It has been discussed to use Gaussian fit to get rid of the dead pixel problem, but I won't use it as the first try. One reason is that the following method is much easier to give us a quick look at the IP. The other is that we have chosen to live with the dead pixels rather than the potential artifacts from scanning mode, but Gaussian fit can introduce artifacts, too.

Method: (Very similar to the way we treat M82.)

1. Since Mars is small, I focus on the central 8X8 pixels.
2. Mask the blue pixels in the following figure for both arrays.



3. Hj is define as the summation of the pixel values in the h array, where j = 1, 2, 3, 4 are the four HWP positions. Similarly, Vj is defined.
4. f is defined as sum(Vj)/sum(Hj)
   (For Mars data, I found f always > 1. I am surprised, since we already used the RGM. Do we have two independent RGMs for h and v?)
5. Following Giles' Angle Conventions
   (http://lennon.astro.northwestern.edu/CSOpol/collaborators/analysis/angle_conventions.html)
   q = mean((f*H1-V1)/(f*H1+V1), (V3-f*H3)/ (V3+f*H3))
   u = mean((f*H2-V2)/(f*H2+V2), (V4-f*H4)/ (V4+f*H4))

Results:

The following figure shows the q and u of 13 observations we have of Mars.

The red cross shows the mean and ± std