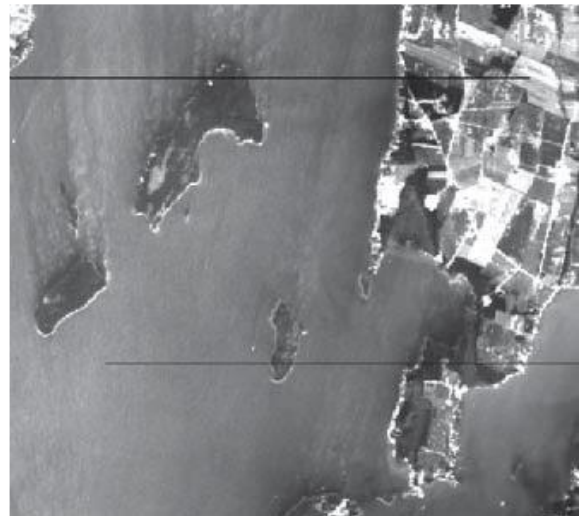
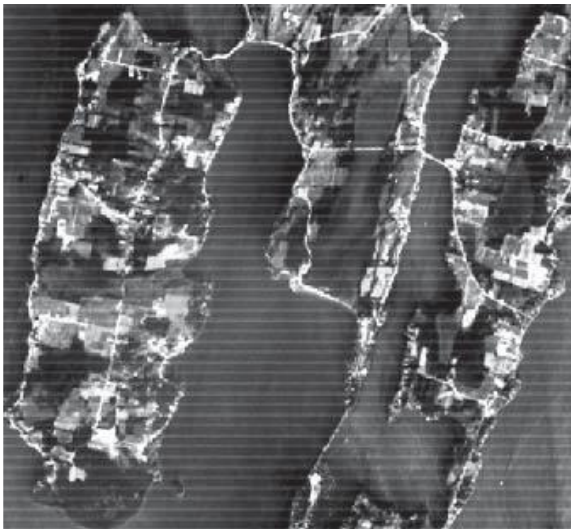


## Geomatics Engineering Department

### Image Processing Question Bank

- 1- What does “DIP” generally consisted in and “Radiometric Correction” particularly consisted in?
- 2- How does “Bit Errors” are conducted? And what is its source production?
- 3- Identify type of error that is visually showed in both figures below in terms of: a) its category b) its source/reason of occurrence c) its correction technique



- 4- Explain with aid of diagram how does seasonal changes effects on solar elevation angle? And what is then its relationship to the solar intensity.
- 5- How does this relationship contribute in the radiometric correction of the image?
- 6- Identify and explain in details the “spatial process” that should be conducted when we perform image-to-map rectification or image-to-image registration.
- 7- For that particular process, how many pixels from the uncorrected image are used to calculate the single pixel value in the corrected image?
- 8- Suppose you have a digital image which has a radiometric resolution of 6 bits. What is the maximum value of the digital number which could be represented in that image?
- 9- Under what conditions do remotely sensed images need to be radiometrically corrected? How?

- 10-Explain the two steps involved in generating a geometrically corrected image. Then identify the image resampling techniques that are commonly used to geometrically correct:
- (1) a classified image; and (2) a reflectance image (i.e., an unclassified image)?
- 11-For each of the three common resampling methods, how many pixels from the uncorrected image are used to calculate the single pixel value in the corrected image?
- 12-For a particular application (such as image classification), the digital number (brightness values) in the original images need to be kept during the resampling interpolation process. Which interpolation method is best for such an application?
- 13-When transforming an image to geographic coordinates, why is it unlikely to directly transfer pixel values from the uncorrected to the corrected image?
- 14-In the process of geometric correction of satellite image, a cell in the output matrix will not directly overlay a pixel in the input matrix, why? How then DN value will eventually assigned to a cell?
- 15-What is the difference between “bilinear interpolation” and “linear interpolation” in terms of satellite image process? Then, identify the key concept of this interpolation process.
- 16-when we perform image to image registration, we need to spatial resampling and intensity interpolation. Name main intensity interpolation method with a brief description of their advantages and disadvantages. For a particular application, the digital numbers (brightness values) in the original image need to be kept during the interpolation process, which method then is the best for such an application?
- 17-Assume you are asked to perform contrast enhancement for band 4(near infrared) of an ETM<sup>+</sup> satellite image obtained in a clear sky of summer 2004.
- If the brightness values range from 30 to 160, write the equation for a simple linear contrast stretch which makes use of the full range of brightness values of 8 bits.
  - What type of contrast enhancement would you use to enhance the contrast within healthy vegetation region of the image? why?

18- An image  $f(m,n)$  of size of  $M1 \times N1$  is to be convolved with a filter array (convolution kernel)  $h(m,n)$  of size of  $M2 \times N2$  to produce a new resulting image  $g(m,n)$ :

- a) Depending on how the convolution is implemented,  $g$  could be one of three different sizes. Specify these sizes.
- b) Describe how does the differentiation of kernel size effects on the image enhancement in terms of the complexity of the methods applied to compute  $g$ .

**19-** Suppose that you have an image that suffer from the following issues:

- a) Image details appeared blurred.
- b) Image is dark.
- c) Image is containing systematic stripping.

Your task is to determine/identify a direct technique/operation that address all of the problems from which the image suffers. Be sure to describe the techniques carefully in terms of defining the reasons behind those problems occurring and their justifications.

20- For what is “Radiometric Normalization” usually implemented on Satellite digital image?

21- What is the basic concept of (segmentation) of satellite image? To what extent it is applicable?