Homework #5
Geology 4113 (Remote Sensing)
Assigned Feb. 23, 2018
Due Mar. 2, 2018

Sabins #5.01, 5.02, 5.03, 5.04, 5.06, and 5.07 (5 points each) plus the following. Remember to convert to Kelvin before using certain formulae. Also, on 5.04, be sure to take into account the emissivity of dolomite.

1) Spectral Mixing. (10 points) Suppose you observe that the reflectance of a surface is 0.58, and you know it is composed of a macroscopic mixture of snow with reflectance 0.9 and dirt with a reflectance of 0.1. Find the relative abundance (i.e. the fraction of the area) covered by the dirt and by the snow.

2) Microscopic mixing

Part A) (5 points) If in the above problem the same proportions of snow and dirt were mixed microscopically would the reflectance be greater than or less than 0.58?

Part B) (5 points) To make a crude quantitative estimate of the reflectance of a 50%-50% microscopic mix surface (not exactly what you have) suppose photons are reflected once off the snow and then once off the dirt before being coming back towards the observer. Find the reflectance of that "double bounce" surface.