

## Homework Assignment 1

**Due: Sep.1**

### **Problem 1** (20 Points)

You are observing a cloud that occupies the portion of the sky defined by  $\pi/4 < \theta < \pi/2$  and  $0 < \phi < \pi/8$ .

- 1) What is the solid angle subtended by the cloud?
- 2) What percentage of the sky is covered by this cloud?

### **Problem 2** (20 Points)

Consider an isotropic radiation field.

- 1) Show that for isotropic radiation, the monochromatic flux is  $F_\lambda = \pi I_\lambda$ .
- 2) Calculate the net monochromatic flux for the isotropic radiation.

### **Problem 3** (20 Points)

Eq.[2.11] (Lecture 2) gives the differential form of the radiative transfer equation expressed in terms of the volume extinction coefficient. Re-write this equation in terms of the mass extinction coefficient and then derive a general solution of the radiative transfer equation (similarly to Eq.[2.13]).