Example

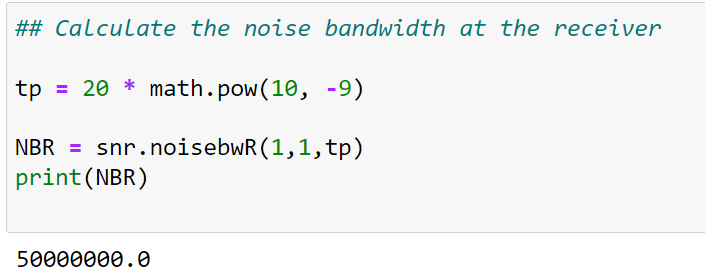
**Laser Rangefinder Range Equation**

1. **Noise Equivalent irradiance**

Calculate the noise bandwidth at the receiver

Kn = 1, Kf = 1, tp= 20ns

NB = = = 50MHz

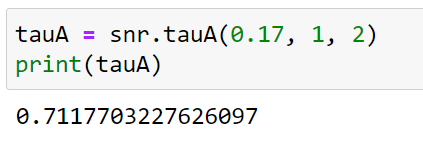


Calculate the receiver filter atmospheric transmittance

∝\_HT = 1

RT = 2000m = 2km

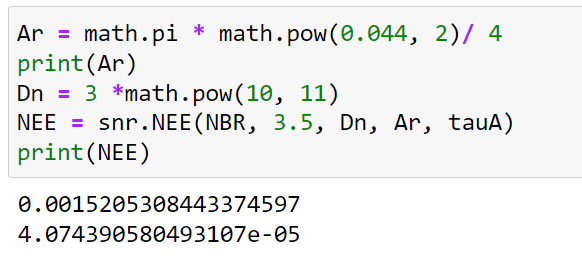
τa =



Calculate the detector noise

Given: D\*=

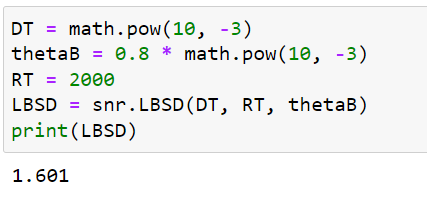
1. Calculating the noise equivalent irradiance at the receiver

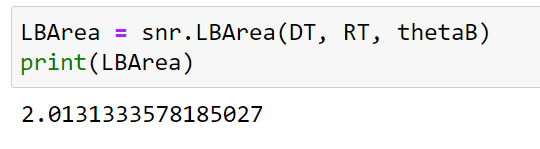


1. **Signal Irradiance**

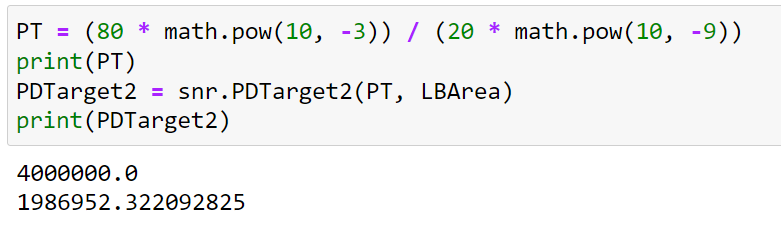
Laser beam spot diameter and area at the target location.

DT = 1 mm

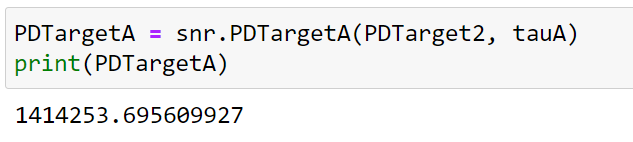




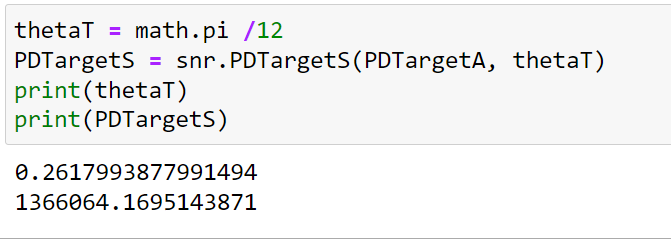
1. Power density at target location without considering the effect of atmospheric attenuation



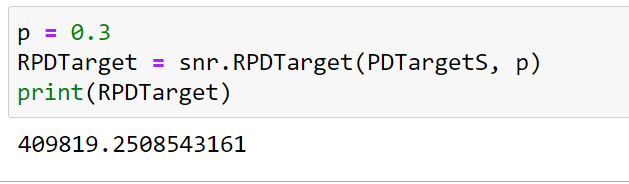
1. Power density at target location with considering the effect of atmospheric attenuation



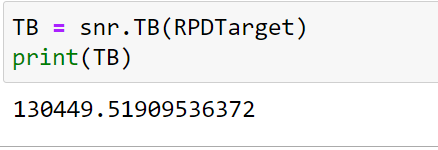
1. Power density at the target surface (target irradiance)



1. **Lambertian Target Reflectance**
2. Laser power density reflected from the target

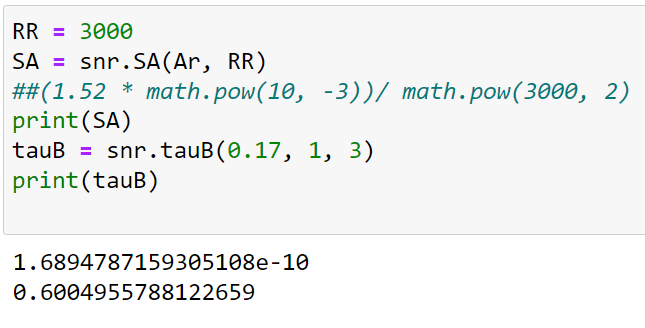


1. reflected power density per unit solid angle (target brightness)

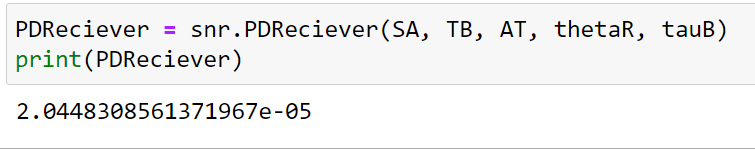


1. Power density available at the receiver location (Receiver Intensity)

Solid Angle =



?



1. **Lambertian Target against the sky**

