

---

# Homework II

---

1. (40%) Consider that an MS with a velocity  $v$  receives an unmodulated carrier with a frequency  $f_c$ . The incidence angle  $\theta(t)$  of the incoming wave is assumed to be uniformly distributed between  $-\pi$  and  $\pi$ .
  - a) If  $v = 20$  km/hr and  $f_c = 2$  GHz, find the distribution function (cdf) and the probability density function (pdf) of the observed Doppler shift via simulation.
  - b) If  $v = 90$  km/hr and  $f_c = 26$  GHz, find the cdf and the pdf of the observed Doppler shift via simulation.
  - c) If  $f_c = 2$  GHz and  $v$  is uniformly distributed between 20 km/hr and 90 km/hr, find the cdf and the pdf of the observed Doppler shift via simulation.
  - d) Derive the cdf and the pdf of the observed Doppler shift for fixed  $v$  and  $f_c$ . Compare the simulation results with the theoretical results.
- 助教: EECS Room 605, [TWNTHUCOM5170@gmail.com](mailto:TWNTHUCOM5170@gmail.com)
- Due Date: 10/28 (You shall submit your paper report during the class. You shall also mail your program to the TA.)