



Examination

Microwave and Radar Remote Sensing

Name:

Matr.-Nr.:

Duration: 2 hours

Auxiliary Material: NO

Berlin, 16th July 2012

1. SAR

(30 P)

- a. You have to design a SAR system. If you want to achieve a range resolution of 15 m which system parameter do you have to adjust? Give a numerical value. (6 P)
- b. Which antenna size do you propose to achieve an azimuth resolution of 5 m? Why is the azimuth resolution better than the one of a SLAR system? (6 P)
- c. What is the PRF (Pulse Repetition Frequency)? Could we use any value for the PRF (justify your answer)? Is there some limits for the PRF? (4 P)
- d. What is the name of the “noise” like effect present in SAR images? What is its particularity? (4 P)
- e. Explain the 3 main geometric distortions (“Layover”, “Foreshortening”, “Shadow”) using a sketch. (7 P)
- f. Make a simple proposal describing how a flooding area could be mapped using SAR images. (3 P)

2. SAR Interferometry

(20)

- a. Outline the principle of a DInSAR system (using a sketch and description) and denote slant-range, azimuth, the position of sensors and all significant parameters. (5 P)
- b. Explain briefly all processing steps that need to be performed in order to obtain an estimation of the surface deformation. (5 P)
- c. How can interferogram quality be evaluated? Denote 2 effects that cause an imprecise deformation measurement and explain their impact on the differential interferogram? (5 P)
- d. Apart from estimating deformation, what is the second main application for SAR interferometry? For both applications, which precision can roughly be achieved with current SAR systems and why? (5 P)

3. SAR Polarimetry

(10 P)

- a. SAR Polarimetry measures 4 channels instead of only 1. Explain how it is possible to obtain these 4 channels using only 2 pulses? (6 P)
- b. Why does the Pauli representation show nicer results than normal SAR channels? (4 P)

60 Points are available in total.

A short and accurate style as well as a clear handwriting should be intended.

Try to make your answers clear and concise, and answer the questions that you find easiest first.

Good Luck!