Numerical Analysis and Scientific Computing Seminar

Mathematics for Remote Sensing and Earth Observation

Cristina Sgattoni
CNR Florence

Abstract: FORUM (Far-infrared Outgoing Radiation Understanding and Monitoring) is a satellite mission selected in 2019 as the ninth ESA (European Space Agency) Earth Explorer mission. FORUM will provide interferometric measurements in the spectral interval encompassing the Far-InfraRed (FIR) part of the spectrum, responsible for about 50In the first part of this seminar, I will focus on the retrieval of the surface emissivity, in particular on the choice of the retrieval grid step and the IVS parameters, using the FORUM simulated measurements in different latitude bands. In the second part, I will discuss the sensitivity of the FORUM simulated measurements to surface emissivity across all latitudes in clear sky conditions and in the presence of clouds in Antarctica. Moreover, I will present procedures for the assimilation of observed data and Bayesian techniques for deriving a database of surface emissivity estimates to adopt as apriori data in the OE procedure. Finally, I will conclude by introducing my future work at Emory, which consists of the use of a fast neural network approach combined with autoencoders to face both the radiative transfer problem and its inversion.

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Mathematics
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