Abstract:
In Computed Tomography (CT), due to the specifics of data acquisition, the generated 2D radiographic images are quite noisy. Their noise characteristics are dominated by the Poisson component. If not removed independently for each of them, this Poisson noise accumulates in the final 3D volume reconstruction, loses its structure and cannot be properly treated anymore. As a result, vital structural information about the scanned object is lost in its digital 3D reconstruction.

In this talk, innovative image reconstruction techniques for 2D and 3D CT data will be discussed. The proposed mathematical models are based on constrained total variation (TV) minimization, while the investigated numerical algorithms are within the class of the Primal-Dual splitting algorithms and allow for efficient parallel implementation. Numerical results on real industrial input data as well as on synthetic data structures are presented and analysed.

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