Monday 11 September 2017
14h00 – 15h00
INP-ENSEEIHT, Salle des thèses

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On the complexity of low-rank matrix approximations

Abstract: In this talk, we first introduce the concept of low-rank matrix approximations (LRA) in the context of dimensionality reduction for data analysis. We then present four important variants and one application for each: (1) weighted LRA used for recommender systems, (2) nonnegative matrix factorization used for hyperspectral unmixing, (3) LRA in the component-wise ell-1 norm used for background substraction in video sequences, and (4) LRA in the component-wise ell-infinity norm used to recover quantized low-rank matrices. For each variant, we discuss the complexity aspects, addressing the following questions: can we solve these problems? If not, are there conditions that allow us to do so?

Bio: Nicolas Gillis received Master degree and Ph.D. degree in Applied Mathematics from the Université catholique de Louvain (Belgium) in 2007 and 2011, respectively. He is currently an Associate Professor at the Department of Mathematics and Operational Research, Faculté polytechnique, Université de Mons, Belgium. N. Gillis received the Householder Award in 2014, and an ERC starting grant in 2015. His research interests lie in optimization, numerical linear algebra, machine learning and data mining.