



UNIVERSIDAD NACIONAL DE COLOMBIA
SEDE BOGOTÁ

FACULTAD DE INGENIERÍA
Vicedecanatura Académica
POSGRADOS

PROPOSAL SUBMISSION

DOCTORAL THESIS: ☒ MASTER THESIS: ☐
MASTER FINAL WORK: ☐ SPECIALIZATION FINAL WORK: ☐

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2. **PROGRAM:** Philosophy Doctoral in Computer Science and Systems Engineering
3. **ADVISOR:** Fabio Augusto González Osorio
DEPARTMENT: Computer Science and Industrial Engineering
4. **TITLE:** Kernel Tensor Factorization
5. **AREA:** Computer Science
6. **LINE OF RESEARCH:** Machine Learning
7. COMMENTARY WITH ADVISOR APROVAL aspectos: organización, perti-

nencia, relevancia y originalidad).

8. BIDDER SIGNATURE

9. SIGNATURE OF ADVISOR

circunstancias y condiciones que llevaron a la conclusión de la necesidad y conveniencia del proyecto)

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1 Basics of the tensor decomposition

1.1 Formulation for tensor completion

low rank matrix completion

$$\begin{aligned} \min_X \text{rank}(X) \\ \text{s.t. } X_\Omega = M_\Omega \end{aligned} \tag{1}$$

where Ω is an index set, then X_Ω is coping entries of X in the indexes Ω and missed entries $\hat{\Omega}$ would be 0

The missing entries in X are determined in order to minimize the matrix X rank. i.e. a non convex optimization problem since rank is nonconvex.

Frequently, trace norm (or nuclear norm) $\|\cdot\|_*$

1.2 Tensor probability

Given a sample set

objetivos propuestos). (WP) in terms of *Tasks* and *Deliverables*, as described below. and feasibility. In addition, activities and schedule will be delimited in concordance with objectives stablished. achievement of the project activities, including successful completion of the tasks and timely production of deliverables. resource accounting. It will also be in charge of managing the relations with collaborating institutions and administrative bodies within. stage before delivery hand over to ensure compliance and coherence. Also, it will follow up project progress anticipating corrective actions and assessing risk mitigation actions. compromiso de la dependencia o empresa cuando sea necesario).

aspectos: organización, pertinencia, relevancia y originalidad).