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	Titolo	Multivariate Data Analysis on Matrix Manifolds : (with Manopt) / / by Nickolay Trendafilov, Michele Gallo
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	Descrizione fisica	1 online resource (467 pages)
	Collana	Springer Series in the Data Sciences, , 2365-5682
	Disciplina	519.535
	Soggetti	Mathematics - Data processing
		Global analysis (Mathematics)
		Manifolds (Mathematics)
		Computer science - Mathematics
		Computational Mathematics and Numerical Analysis
		Global Analysis and Analysis on Manifolds
		Mathematical Applications in Computer Science
	Lingua di pubblicazione	Inglese
	Formato	Materiale a stampa
	Livello bibliografico	Monografia
	Nota di contenuto	Introduction -- Matrix analysis and differentiation -- Matrix manifolds in MDA -- Principal component analysis (PCA) -- Factor analysis (FA) -- Procrustes analysis (PA) -- Linear discriminant analysis (LDA) -- Canonical correlation analysis (CCA) -- Common principal components (CPC) -- Metric multidimensional scaling (MDS) and related methods -- Data analysis on simplexes.
	Sommario/riassunto	This graduate-level textbook aims to give a unified presentation and solution of several commonly used techniques for multivariate data analysis (MDA). Unlike similar texts, it treats the MDA problems as optimization problems on matrix manifolds defined by the MDA model parameters, allowing them to be solved using (free) optimization software Manopt. The book includes numerous in-text examples as well as Manopt codes and software guides, which can be applied directly or used as templates for solving similar and new problems. The first two chapters provide an overview and essential background for studying MDA, giving basic information and notations. Next, it

considers several sets of matrices routinely used in MDA as parameter spaces, along with their basic topological properties. A brief introduction to matrix (Riemannian) manifolds and optimization methods on them with Manopt complete the MDA prerequisite. The remaining chapters study individual MDA techniques in depth. The number ofexercises complement the main text with additional information and occasionally involve open and/or challenging research questions. Suitable fields include computational statistics, data analysis, data mining and data science, as well as theoretical computer science, machine learning and optimization. It is assumed that the readers have some familiarity with MDA and some experience with matrix analysis, computing, and optimization. .