

Contents

Part I State-of-the-Art Surveys and Original Matrix Theory Work

1	Supremum/Infimum and Nonlinear Averaging of Positive Definite Symmetric Matrices	3
	Jesús Angulo	
2	The Riemannian Mean of Positive Matrices	35
	Rajendra Bhatia	
3	The Geometry of Low-Rank Kalman Filters	53
	Silvère Bonnabel and Rodolphe Sepulchre	
4	KV Cohomology in Information Geometry	69
	Michel Nguiffo Boyom and Paul Mirabeau Byande	
5	Derivatives of Multilinear Functions of Matrices	93
	Priyanka Grover	
6	Jensen Divergence-Based Means of SPD Matrices	111
	Frank Nielsen, Meizhu Liu and Baba C. Vemuri	
7	Exponential Barycenters of the Canonical Cartan Connection and Invariant Means on Lie Groups	123
	Xavier Pennec and Vincent Arsigny	

Part II Advanced Matrix Theory for Radar Processing

8	Medians and Means in Riemannian Geometry: Existence, Uniqueness and Computation	169
	Marc Arnaudon, Frédéric Barbaresco and Le Yang	

9 Information Geometry of Covariance Matrix: Cartan-Siegel Homogeneous Bounded Domains, Mostow/Berger Fibration and Fréchet Median 199
Frédéric Barbaresco

10 On the Use of Matrix Information Geometry for Polarimetric SAR Image Classification 257
Pierre Formont, Jean-Philippe Ovarlez and Frédéric Pascal

11 Doppler Information Geometry for Wake Turbulence Monitoring. 277
Zhongxun Liu and Frédéric Barbaresco

Part III Matrix-Based Signal Processing Applications

12 Review of the Application of Matrix Information Theory in Video Surveillance 293
M. K. Bhuyan and T. Malathi

13 Comparative Evaluation of Symmetric SVD Algorithms for Real-Time Face and Eye Tracking. 323
Tapan Pradhan, Aurobinda Routray and Bibek Kabi

14 Real-Time Detection of Overlapping Sound Events with Non-Negative Matrix Factorization 341
Arnaud Dessein, Arshia Cont and Guillaume Lemaitre

15 Mining Matrix Data with Bregman Matrix Divergences for Portfolio Selection. 373
Richard Nock, Brice Magdalou, Eric Briys and Frank Nielsen

16 Learning Mixtures by Simplifying Kernel Density Estimators . . . 403
Olivier Schwander and Frank Nielsen

17 Particle Filtering on Riemannian Manifolds. Application to Covariance Matrices Tracking 427
Hichem Snoussi

Index 451



<http://www.springer.com/978-3-642-30231-2>

Matrix Information Geometry

(Eds.)F. Nielsen; R. Bhatia

2013, XII, 454 p. 104 illus., Hardcover

ISBN: 978-3-642-30231-2