**FOUNDATIONS OF COMPUTATIONAL BIOLOGY**

with MATLAB programming

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**Syllabus - Contents**

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CHAPTER 2: Change of basis.

CHAPTER 3: Matrix factorization and systems of linear equations.

CHAPTER 4: The fundamental theorem of linear algebra.

CHAPTER 5: Projections.

CHAPTER 6: Least squares.

CHAPTER 7: Duality, Optimization and Minimum Principles.

CHAPTER 8: Non-linear least squares.

CHAPTER 9: Eigenvalues and eigenvectors.

CHAPTER 10: Principal component analysis.

CHAPTER 11: Singular Value Decomposition (SVD).

CHAPTER 12: Singular Value Decomposition (SVD) of microarray data.

CHAPTER 13: Simulation of chemical reactions.

CHAPTER 14: Simulation and analysis of Binding Reactions.

CHAPTER 15: Simulation and analysis of Enzymatic Reactions.

CHAPTER 16: Dynamic simulation of a network of chemical reactions, Metabolic Control Analysis (MCA), Pharmacokinetics/Pharmacodynamics (PKPD).

CHAPTER 17: Unconstrained minimization.

CHAPTER 18: Duality and Linear Programming.

CHAPTER 19: Metabolic Network Reconstruction, Flux Balance Analysis.

CHAPTER 20: Information Theory.

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