CS 6190: Probabilistic Modeling Spring 2019

A Brief Introduction to Matrix Derivative

November 4, 2019

1 Linear Algebra Basic(Matrix Calculation)

- **1.1** Definition of Matrix
- **1.2** Basic Matrix Arithmetic
- **1.3** Commonly Used Property of Matrix Operators(*det*, *trace*, *inv*)
- 1.4 Dot Product, Inner Product, Trace
- 1.5 Exercise

2 Differential Calculus

- 2.1 Uni-variate Derivative (f') and Differential (df), Chain Rule
- 2.2 Multi-variate Scalar Functions and Total differential
- 2.3 Exact Differential Form and Type-II Path Integral
- 2.4 General Matrix Derivative
- 2.5 Examples and Exercise