Technion – Israel Institute of Technology



HW1

**Vision Aided Navigation**

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November 17, 2021

# Basic Probability and Bayesian Inference

## Question 1 : Consider a random vector with a Gaussian distribution, written in covariance form Show the corresponding information form is:

is symmetric is symmetric too , so is symmetric.

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## Question 2 : Consider a standard observation model involving a random variable . and assume the initial belief regarding the state is a Gaussian with mean and covariance .

### Write an expression for the prior and the measurement likelihood .

### A measurement is acquired. Assuming the measurement was generated by the measurement model (1), write an expression for the posterior probability in terms of and the measurement likelihood .

### Derive expressions for the a posteriori mean and covariance such that

### A second measurement, , is obtained. Assuming from last clause is given, derive expressions for .

## Question 3 : Consider a multivariate random variable . with the following state transition mode and a standard observation model as in exercise 2.

### Write an expression for the motion mode