## ESTIMATION AND DETECTION THEORY

## HOMEWORK # 3:

Please work out the **ten** (10) problems stated below – HVP refers to the text: H. Vincent Poor, An Introduction to Signal Detection and Estimation (Second Edition), Springer Texts in Electrical Engineering Springer, New York (NY), 2010. With this in mind, Exercise **II.2** (HVP) refers to Exercise 2 for Chapter II of HVP. Exercises are located at the end of each chapter.

Show work and explain reasoning.

1
Consider the simple binary hypothesis testing problem
$H_1:  Y \sim \mathrm{N}(a,1) \ H_0:  Y \sim \mathrm{N}(0,1)$
with $a \neq 0$ , under the probability of error criterion.  1.a Compute the Bayes value $V: [0,1] \to [0,1]: p \to V(p)$ .  1.b Can you show $directly$ that $V: [0,1] \to [0,1]$ is a differentiable function? a concave function?  1.c Find $p_{\rm m}$ .
2Solve Part (b) of Exercise II.2 (HVP).
3
Solve Part (b) of Exercise II.3 (HVP)
4
Solve Part (b) of Exercise II.4 (HVP)
5
Solve Part (b) of Exercise II.5 (HVP)
6
Solve Part (b) of Exercise II.7 (HVP)
7
Solve Part (a) of Exercise II.9 (HVP)

8			
9			
10			

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