Started on	Sunday, 8 October 2023, 6:03 PM
State	Finished
Completed on	Sunday, 8 October 2023, 6:38 PM
Time taken	35 mins 22 secs
Grade	**10.00** out of 10.00 (**100**%)

Question **1**
Correct
Mark 1.00 out of 1.00
Flag question

Concepts of detection theory can be used

Select one:
- Only in Wireless Technology
- All of these ✔
- Only in RADAR
- Only in Machine Learning

Your answer is correct.

The correct answer is:
All of these

Question **2**
Correct
Mark 1.00 out of 1.00
Flag question

The general problem in detection is

Select one:
- Multiple cost determination
- Binary hypothesis testing ✔
- Gaussian discriminant analysis
- Optimal pattern recognition

Your answer is correct.

The correct answer is: Binary hypothesis testing

Question **3**
Correct
Mark 1.00 out of 1.00
Flag question

Consider the binary hypothesis testing problem described in lectures with noise variance 4. The distribution of the output under H_0 is

Select one:
- $\mathcal{N}(0, 2\mathbf{I})$
- $\mathcal{N}(\bar{\mathbf{s}}, 2\mathbf{I})$
- $\mathcal{N}(\bar{\mathbf{s}}, 4\mathbf{I})$
- $\mathcal{N}(0, 4\mathbf{I})$ ✔

Your answer is correct.

The correct answer is: $\mathcal{N}(0, 4\mathbf{I})$

Question **4**

Correct

Mark 1.00 out of 1.00

Flag question

Consider the binary hypothesis testing problem described in lectures with noise variance 1. The distribution of the output under H_1 is

Select one:

- $\mathcal{N}(\bar{\mathbf{s}}, \mathbf{I})$ ✔
- $\mathcal{N}(0, \mathbf{I})$
- $\mathcal{N}(0, 2\mathbf{I})$
- $\mathcal{N}(\bar{\mathbf{s}}, 2\mathbf{I})$

Your answer is correct.

The correct answer is: $\mathcal{N}(\bar{\mathbf{s}}, \mathbf{I})$

Question **5**

Correct

Mark 1.00 out of 1.00

Flag question

Consider the binary hypothesis testing problem described in lectures with noise variance σ^2. The likelihood of H_0 is

Select one:

- $\left(\frac{1}{2\pi\sigma^2}\right)^{\frac{N}{2}} e^{-\frac{\sum_{i=1}^{N} y(i)}{2\sigma^2}}$
- $\left(\frac{1}{2\pi\sigma^2}\right)^{\frac{N}{2}} e^{-\frac{\left(\sum_{i=0}^{N} y(i)-s(i)\right)^2}{2\sigma^2}}$
- $\left(\frac{1}{2\pi\sigma^2}\right)^{\frac{N}{2}} e^{-\frac{\sum_{i=1}^{N} y^2(i)}{2\sigma^2}}$ ✔
- $\left(\frac{1}{2\pi\sigma^2}\right)^{\frac{N}{2}} e^{-\frac{\sum_{i=0}^{N}\left(y(i)-s(i)\right)^2}{2\sigma^2}}$

Your answer is correct.

The correct answer is: $\left(\frac{1}{2\pi\sigma^2}\right)^{\frac{N}{2}} e^{-\frac{\sum_{i=1}^{N} y^2(i)}{2\sigma^2}}$

Question **6**

Correct

Mark 1.00 out of 1.00

Flag question

Consider the binary hypothesis testing problem described in lectures with noise variance σ^2. The likelihood of H_1 is

Select one:

- $\left(\frac{1}{2\pi\sigma^2}\right)^{\frac{N}{2}} e^{-\frac{\sum_{i=1}^{N} y(i)}{2\sigma^2}}$
- $\left(\frac{1}{2\pi\sigma^2}\right)^{\frac{N}{2}} e^{-\frac{\left(\sum_{i=0}^{N} y(i)-s(i)\right)^2}{2\sigma^2}}$
- $\left(\frac{1}{2\pi\sigma^2}\right)^{\frac{N}{2}} e^{-\frac{\sum_{i=1}^{N} y^2(i)}{2\sigma^2}}$
- $\left(\frac{1}{2\pi\sigma^2}\right)^{\frac{N}{2}} e^{-\frac{\sum_{i=0}^{N}\left(y(i)-s(i)\right)^2}{2\sigma^2}}$ ✔

Your answer is correct.

The correct answer is: $\left(\frac{1}{2\pi\sigma^2}\right)^{\frac{N}{2}} e^{-\frac{\sum_{i=0}^{N}\left(y(i)-s(i)\right)^2}{2\sigma^2}}$

The principal tool in detection is

Question **7**

Correct

Mark 1.00 out of 1.00

Flag question

Select one:

- Maximum Likelihood
- Likelihood Ratio Test ✔
- Maximum Aposteriori Probability
- Minimum Mean Squared Error

Your answer is correct.

The correct answer is: Likelihood Ratio Test

Question **8**

Correct

Mark 1.00 out of 1.00

Flag question

The LRT chooses H_0 if

Select one:

- $\frac{p(\bar{\mathbf{y}};\mathcal{H}_0)}{p(\bar{\mathbf{y}};\mathcal{H}_1)} \geq \tilde{\gamma}$ ✔
- $\frac{p(\bar{\mathbf{y}};\mathcal{H}_0)}{p(\bar{\mathbf{y}};\mathcal{H}_1)} \geq 1$
- $\frac{p(\bar{\mathbf{y}};\mathcal{H}_0)}{p(\bar{\mathbf{y}};\mathcal{H}_1)} < \tilde{\gamma}$
- $\frac{p(\bar{\mathbf{y}};\mathcal{H}_0)}{p(\bar{\mathbf{y}};\mathcal{H}_1)} < 1$

Your answer is correct.

The correct answer is: $\frac{p(\bar{\mathbf{y}};\mathcal{H}_0)}{p(\bar{\mathbf{y}};\mathcal{H}_1)} \geq \tilde{\gamma}$

Question **9**

Correct

Mark 1.00 out of 1.00

Flag question

The LRT for the signal detection problem reduces to choose H_0 if

Select one:

- $\bar{\mathbf{s}}^T\bar{\mathbf{y}} \leq \gamma$ ✔
- $\bar{\mathbf{s}}^T\bar{\mathbf{y}} > \gamma$
- $\bar{\mathbf{s}}^T\bar{\mathbf{y}} \leq 1$
- $\bar{\mathbf{s}}^T\bar{\mathbf{y}} > 1$

Your answer is correct.

The correct answer is: $\bar{\mathbf{s}}^T\bar{\mathbf{y}} \leq \gamma$

Question **10**

Correct

Mark 1.00 out of 1.00

Flag question

The LRT reduces to the ML decision rule for \gamma=

Select one:

- $||\bar{\mathbf{s}}||^2$
- $\frac{||\bar{\mathbf{s}}||^2}{2}$ ✔
- $||\bar{\mathbf{s}}||$

- $\frac{||\bar{s}||^2}{4}$

Your answer is correct.

The correct answer is: $\frac{||\bar{s}||^2}{2}$

Finish review