Congratulations! You passed!

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1. Measurements are drawn from a Gaussian distribution with variance σ^2. Which of the estimators below will provide the 'best' estimate of the true value of a parameter? Select any/all that apply:

1 / 1 point

- [x] Maximum Likelihood

  Correct
  Correct! By definition, a maximum likelihood estimator will find the parameter value with the greatest likelihood of being the 'true' value. ML and LS estimators are equivalent in this case.

- [x] Least Squares

  Correct
  Correct! Since all of the variances are identical, ordinary least squares can be used.

- [x] Weighed Least Squares

  Correct
  Correct! Even when all variances are identical, weighted least squares can be applied.

2. Which of the following statements are correct? Select any/all that apply:

2 / 2 points

- [ ] When measurements are drawn from a non-Gaussian distribution, a maximum likelihood estimator produces the same values as weighted least squares.
- [x] When measurement noise comes from a large number of independent sources, a least squares estimator can be used.

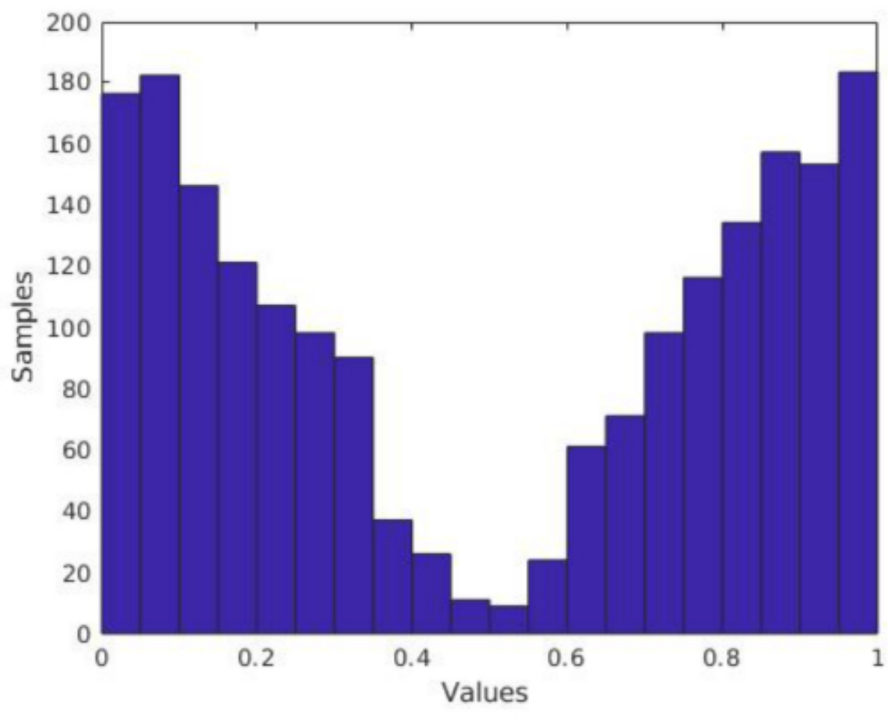
  Correct
  Correct! The Central Limit Theorem states that when a noise comes from a large number of independent sources, the noise distribution will tend towards a Gaussian distribution.

- [x] Least squares estimators are significantly affected by outliers.

  Correct
  Correct! Outliers are not well handled by least squares estimators, since these estimators minimize the sum of *squared* errors.

3.

1 / 1 point



Given the above histogram of noisy measurements, it is appropriate to use a LS estimator?

- ( ) True
- (•) False

Correct
Correct! The distribution of the measurements is clearly not Gaussian, which suggests that least squares will do a poor job.

4. Looking at the histogram in the previous question, what could be the reason for such a distribution of measurements? Select any/all that apply:

1 / 1 point

- [x] The measured value might be changing.

  Correct
  Correct! If the measured value is changing (e.g., perhaps switching between two discrete values), the histogram will have multiple peaks.

- [ ] The measurement is affected by zero mean Gaussian noise.
- [x] There is an outside disturbance affecting the sensor.

  Correct
  Correct! Even if the measured value is static, a disturbance affecting the sensor (e.g., unmodeled vibrations or someone moving the sensor) might cause significantly different measurements to be produced.