Exercises: Quality of measurements

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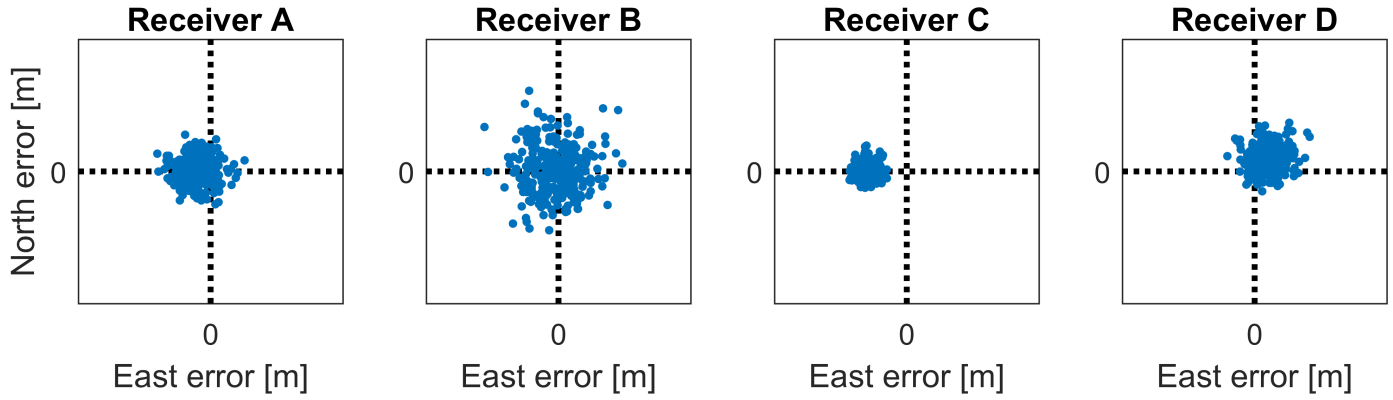
GPS positions

7/7 points (ungraded)

GPS was used to estimate the position of 4 different static receivers (i.e., the receivers were not moving). The measurements were repeated 200 times, and the errors in the horizontal positions are shown in the figures below.



Which receiver performs best in terms of precision?

C

✔ Answer: C

- 3. Least Squares Estimation (LSE)
- 4. Best Linear Unbiased Estimation (BLUE)
- Pre-knowledge Mathematics
- MATLAB Learning Content

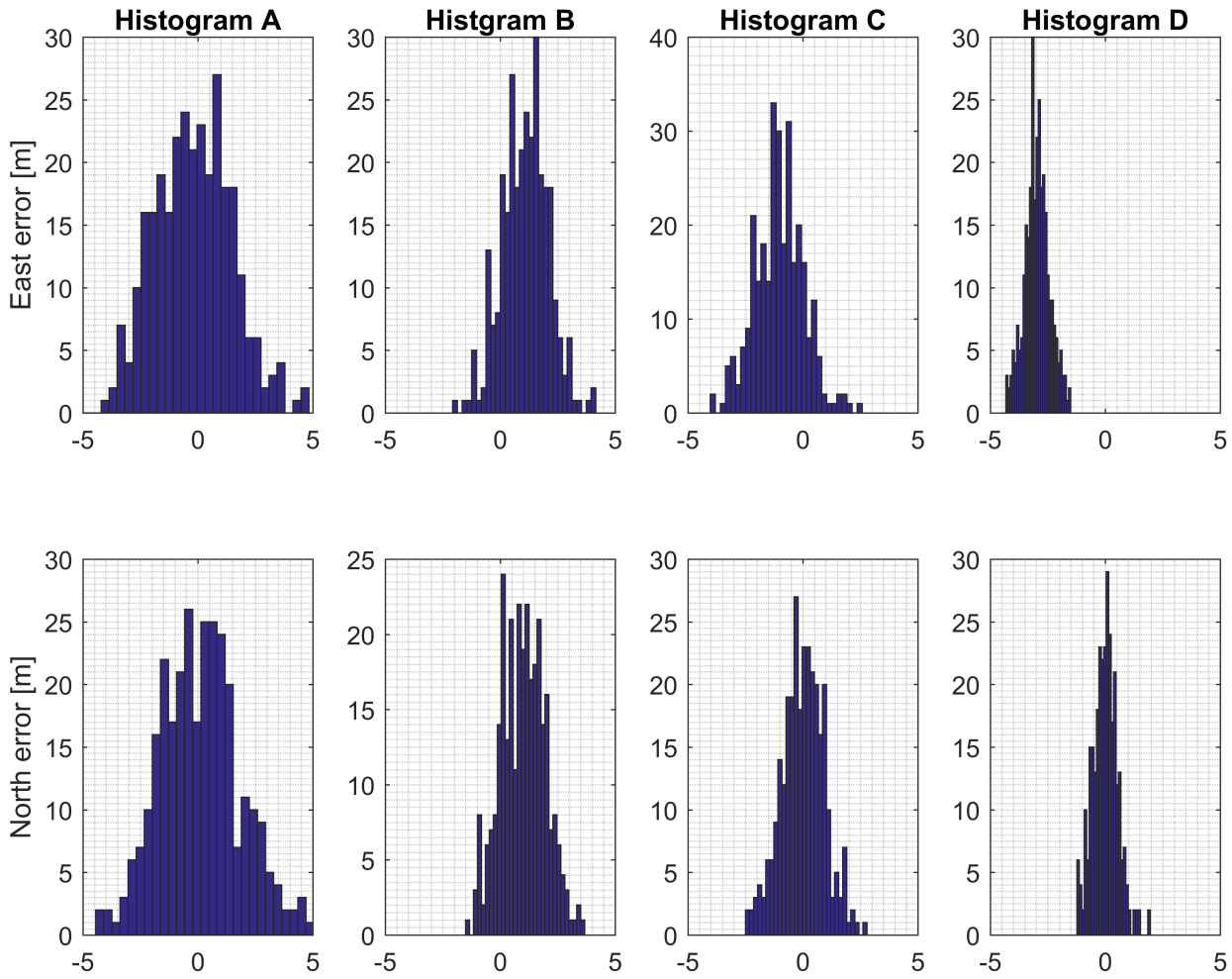
Which receiver performs best in terms of accuracy?

B ✔ **Answer:** B

Which type of error caused the lower accuracy in the case of the lowest accuracy?

systematic bias ✔ **Answer:** systematic bias

Histograms of all four receivers have been made. Which histogram belongs to each of the receivers?



Which receiver is represented in histogram A?

B ▾ ✔ **Answer:** B

Which receiver is represented in histogram B?

D ✔ **Answer:** D

Which receiver is represented in histogram C?

A ✔ **Answer:** A

Which receiver is represented in histogram D?

C ✔ **Answer:** C

Explanation
Precision is related to the spread in the outcomes, accuracy to the closeness to the truth. Receivers A, C and D give low accuracy - all measurements are affected by the same error (apart from the random errors), which must therefore be a systematic bias.

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✔ Correct (7/7 points)

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