4. Systematic vs. Random Errors

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The diagram below illustrates the distinction between **systematic** and **random** errors. Systematic errors tend to be consistent in magnitude and/or direction. If the magnitude and direction of the error is known, accuracy can be improved by additive or proportional corrections. **Additive correction** involves adding or subtracting a constant adjustment factor to each measurement; **proportional correction** involves multiplying the measurement(s) by a constant.

Unlike systematic errors, random errors vary in magnitude and direction. It is possible to calculate the average of a set of measured positions, however, and that average is likely to be more accurate than most of the measurements.

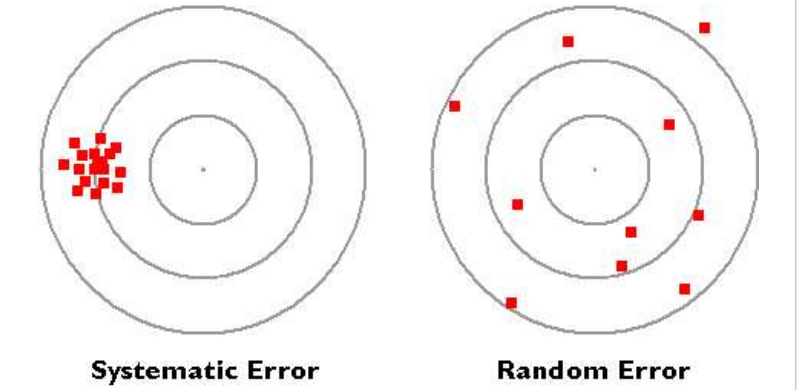

Figure 5.5.1 Systematic and random errors.

In the sections that follow, we compare the accuracy and sources of error of two important positioning technologies: land surveying and the Global Positioning System.

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