# Problem 86

The length and width of a rectangular room are measured to be $3.955 \pm 0.005$ m and $3.050 \pm 0.005$ m. Calculate the area of the room and its uncertainty in square meters.

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**Solution**

Multiply the upper bounds for length and width to get the maximum area, and multiply the lower bounds for length and width to get the minimum area.

$$\text{Maximum Area:} \quad (3.955 + 0.005 \text{ m})(3.050 + 0.005 \text{ m}) \approx 12.10 \text{ m}^2$$

$$\text{Minimum Area:} \quad (3.955 - 0.005 \text{ m})(3.050 - 0.005 \text{ m}) \approx 12.03 \text{ m}^2$$

Therefore, the area of the room is about

$$\left( \frac{12.10 + 12.03}{2} \pm \frac{12.10 - 12.03}{2} \right) \text{m}^2$$

$$12.06 \pm 0.035 \text{ m}^2.$$