

# 5-Localization-0

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## 1 5. Robot localization

In the upcoming chapters we will cover three fundamental aspects of mobile robots: robot localization, map building, and simultaneous localization and mapping (SLAM).

Citing Cox [1]:

*Using sensory information to locate the robot in its environment is the most fundamental problem to providing a mobile robot with autonomous capabilities*

Concretely, the goal of **robot localization** is, given a map of the environment and a sequence of sensor measurements, to retrieve the robot's pose in such environment.

Localization problems can be grouped into different types (see Fig.1 below): - **Position tracking**: the robot knows approximately where it is (for example, using odometry readings, which have to come at a certain frequency). - **Global localization**: the robot has no clue where it is (e.g. GPS). It is needed when the robot is turned on. - **Kidnapped robot problem**: the robot thinks that it knows where it is, but is wrong!

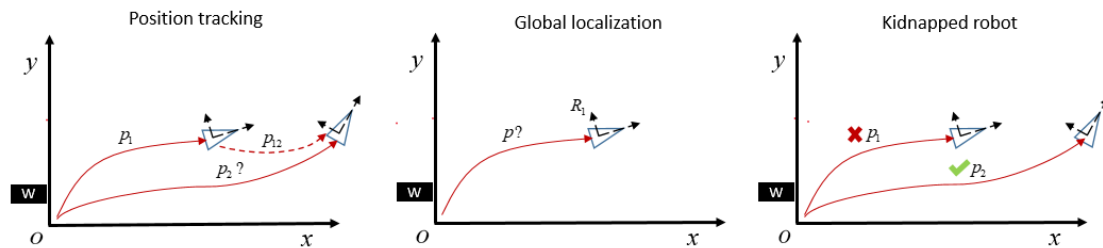


Fig. 1. Different types of localization problems.

### 1.1 References

[1] Cox, Ingemar J. "Blanche-an experiment in guidance and navigation of an autonomous robot vehicle." IEEE Transactions on robotics and automation 7, no. 2 (1991): 193-204.