

# L7-C1 Robot localisation using particle filter

In a line-following differential robot for manufacturing we estimate the displacement of the robot based on a particle filter applied on data from the wheel encoders. The motion prediction is done every  $\Delta t$  seconds based on the line readings, with the robot running at speed  $v$  [mm/s] measured by the encoders. We use a referential with  $x$  [mm] aligned with the line, and  $y$  [mm] perpendicular to the line. What would the best candidate for a motion model be? The function  $\text{rand}()$  gives a random number between  $+0.1$  and  $-0.1$ .



- A.  $x_{n+1} = x_n + v \cdot \Delta t + v \cdot \Delta t \cdot \text{rand}()$
- B.  $x_{n+1} = x_n + v \cdot \Delta t + v \cdot \Delta t \cdot \text{rand}()$
- C.  $x_{n+1} = x_n + v \cdot \Delta t + v \cdot \Delta t \cdot \text{rand}()^5$

- $y_{n+1} = y_n + v \cdot \Delta t \cdot \text{rand}()^5$
- $y_{n+1} = y_n + v \cdot \Delta t \cdot \text{rand}()$
- $y_{n+1} = y_n + v \cdot \Delta t \cdot \text{rand}()$