

Determining Current Position of a Mecanum Robot From Wheel Speeds Over Time

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March 8, 2013

1 Definitions

- Let v be a function that takes \mathbb{R} — a time — and returns \mathbb{R}^4 — the velocity of each wheel obtained by sensor data.
- Let r be a function that takes $\mathbb{R}^4 * \mathbb{R}$ — the velocity of each wheel and the absolute angle of the robot — and returns $\mathbb{R}^2 * \mathbb{R}$ — the velocity of the robot and the rotational velocity of the robot.
- Let n be a function that takes \mathbb{R}^4 — the velocity of each wheel — and returns \mathbb{R} — the rotational velocity of the robot.
- Let k be a function that takes \mathbb{R} — a time — and returns $\mathbb{R}^2 * \mathbb{R}$ — the velocity of the robot and the rotational velocity of the robot

2 Forward Kinematics

The goal of forward kinematics is to find k — where the robot is given a time. This can be found with

$$k(t) = \left(r \left(v(t), \int_0^t n(x) dx \right), n(t) \right)$$