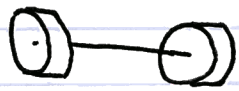
Differential drive!

- two wheels on common axis and can spin indep

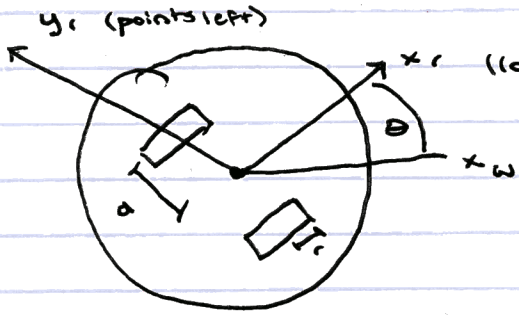


but the wheels can rotate indep

turtlebot:

and there are also rollers

giant turtlebot!!



#topview

① what if both wheels spin at a velocity of κ rad/s

So $v_L = \kappa$ $v_R = \kappa$

So then look at motion in world

forward, sideways, any

$\dot{x}_R = r\kappa$ b/c wheels spin at

$\dot{y}_R = 0$ in/s

$\dot{\theta}_R = 0$ in/s

Angle	Length
2π rad ~	$2\pi r$ m
1 rad ~	r m

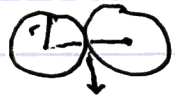
② Little bit harder. What if $v_R = \kappa$ $v_L = -\kappa$

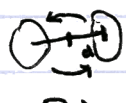
same speed diff directions

$\dot{x}_R = 0$

$\dot{y}_R = 0$

$\dot{\theta}_R =$





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$\frac{\kappa r}{a} = \theta$

- then let's look at $\dot{\theta}_R$

  suggestion 1: krd

  $\frac{rad}{s}$ = DIMENSIONLESS

  $1/s$

  dimensional analysis gives $\frac{1}{s} \cdot m \cdot m$

  answer: $\frac{kr}{d}$

let's derive this:

- think about proportionality

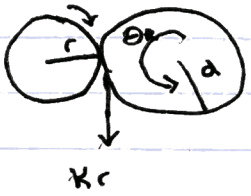
  - $\dot{\theta}_R \propto r$

    b/c more speed means quicker

  if r is big, linear motion is going to be faster

  therefore

  - directly ∝ to r
  - indirectly related to d



$\dot{\theta}_R d = kr$

$\dot{\theta}_R = \frac{kr}{d}$

③ $v_R = R$ $v_L = 0$

this one is tricky!