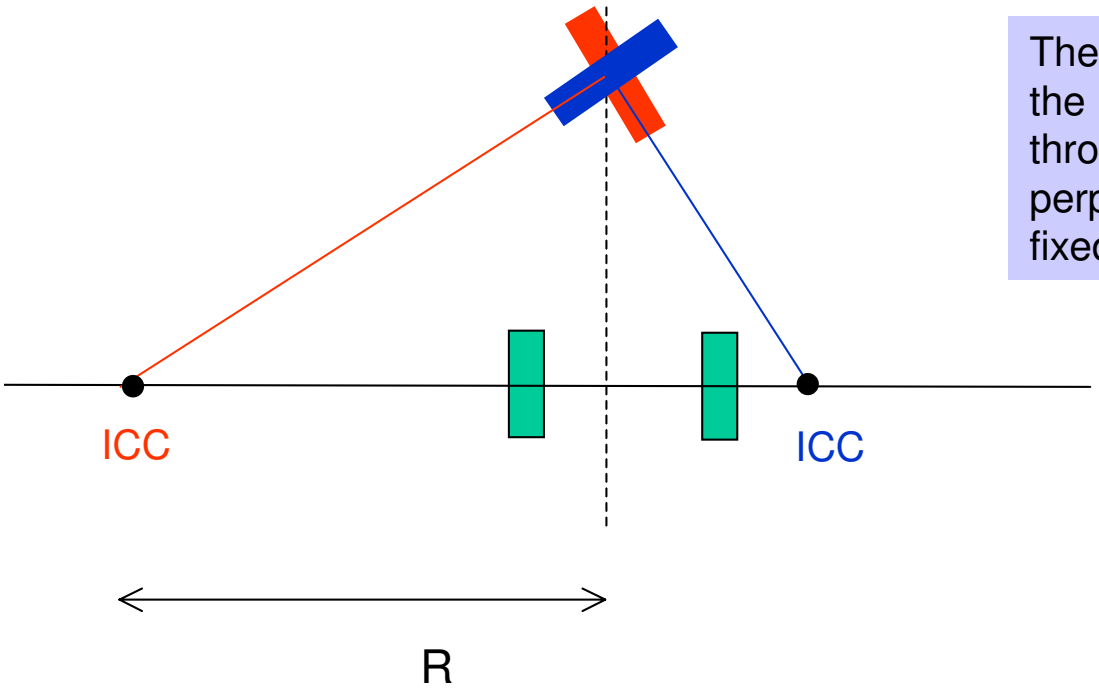
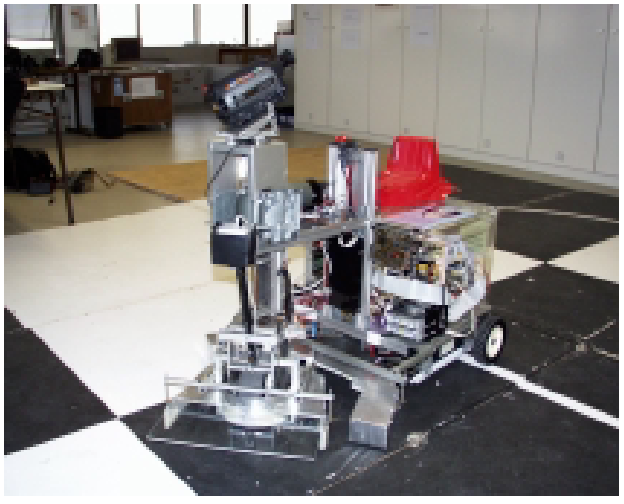
Tricycle

- Three wheels and odometers on the two rear wheels
- Steering and power are provided through the front wheel

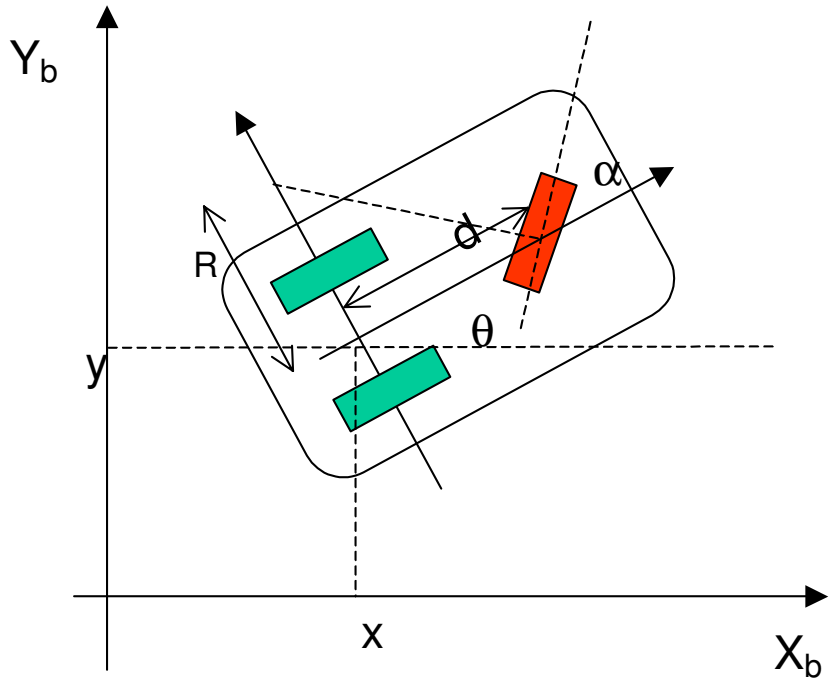
- control variables:
  - steering direction $\alpha(t)$
  - angular velocity of steering wheel $w_s(t)$



The ICC must lie on the line that passes through, and is perpendicular to, the fixed rear wheels



Tricycle



If the steering wheel is set to an angle α(t) from the straight-line direction, the tricycle will rotate with angular velocity w(t) about a point lying a distance R along the line perpendicular to and passing through the rear wheels.

r = steering wheel radius

$$v_s(t) = w_s(t)\, r$$ linear velocity of steering wheel

$$R(t) = d\, tg\left(\pi/2 - \alpha(t)\right)$$

$$w(t) = \frac{w_s(t)\, r}{\sqrt{d^2 + R(t)^2}}$$ angular velocity of the moving frame relative to the base frame

$$w(t) = \frac{v_s(t)}{d} \sin\alpha(t)$$