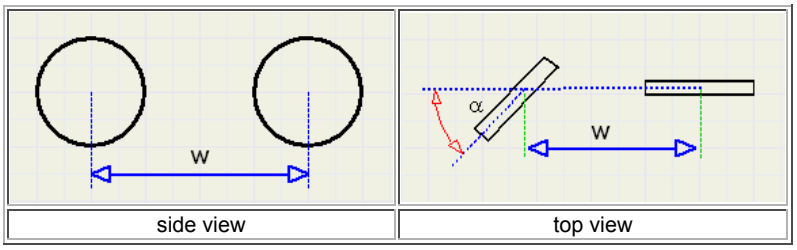
Turning Radius calculation

Introduction

This article describes the calculation of the turning radius of a car or bicycle.
This radius depends on two things:

- the wheelbase w , which is the distance between the front- and the rear wheel
- the angle a of the front wheel

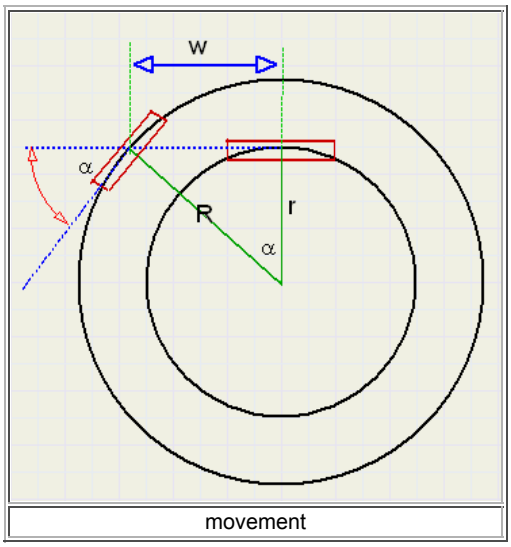
We suppose that only the front wheel is able to turn.
See figure below:



side view | top view

Calculation

The front and rear wheel follow a circle with the same center.
At all times, the direction is perpendicular to the radius.
See figure below:



movement

The radius of the front wheel is R, the rear wheel r.
From the figure above we conclude:

$$\sin(\alpha)=\frac{W}{R}$$

$$R = \frac{W}{\sin(\alpha)}$$

also

$$\tan(\alpha) = \frac{W}{r}$$

$$r = \frac{W}{\tan(\alpha)}$$