## The CTRV (Constant turn rate and velocity) model

## Initial state and covariance matrix

Initialized by LIDAR

Given

Initial state is

Initial P is

Initialized by RADAR

Given

Initial state is

Initial P is

### Generate Sigma point

## UKF augmentation

### Augmented state

### Augmented Covariance matrix

## Sigma point prediction

if is not zero

## Predicted mean and covariance

Weight

Predicted Mean

Predicted Covariance

## Measurement model

State Vector

### LIDAR

Measurement Vector

Measurement Model

### RADAR

Measurement Vector

Measurement Model

Predicted measurement model

Predict Covariance

### UKF Update

Cross-correlation Matrix

Kalman gain K

Update State

Covariance Matrix Update