

Robofest® Summer RoboMath® Camp for Advanced High School Students, Coaches, Parents, College Students, and Anyone (Tue., July 12, 9am ~ 4pm at Lawrence Tech. Free Lunch provided.)

Introduction to the Kalman Filter in 6 hours – Wow!



Rudolf Emil Kalman



What is a Kalman Filter (KF)?

- A linear system: $f(a+b) = f(a) + f(b)$
- Noisy data in → hopefully less noisy out

Applications of KF: Sensor fusion and data fusion

- Tracking missiles, Navigation, Attitude Heading Reference System, Autopilot, Dynamic positioning, Inertial guidance system, etc.
- Simultaneous localization and mapping (SLAM)
- Battery state of charge (SoC) estimation
- Seismology
- Economics, in particular macroeconomics, time series, and econometrics
- Weather forecasting
- A lot of computer vision applications such as extracting lip motion from video
- Brain-computer interface

Camp Topics

- We will first cover (or review) math basics for around 2 ~ 2.5 hours.
 - ✓ Linear Algebra: vectors, matrices, and matrix multiplication
 - ✓ Calculus: the basic concepts of derivative and integral
 - ✓ Probability: probability of an event, conditional probability, mean, variance, covariance, and normal distribution
- Introduction of KF algorithm
- Implementation of a simple example using Lego NXTs with RobotC

How to register

- Send email to chung@LTU.edu; Use subject line: Kalman Filter
- Registration is free and space is limited, so please register early!

Robofest® RoboMath® camp is sponsored by TARDEC/Joint Center for Robotics