

# **Stryke Force Team 2767 Talon SRX Motor training course Dec 2017**

## **Presented by Jerry Culp, systems mentor**

### **Chapter 1, Motors - 46 min**

- Motor Physics and Construction
- Motor Model and Schematic
- Motor Speed Torque Curve
- Motor Performance – Power and Efficiency
- Motors in FIRST – Choices and Tradeoffs
- Gearboxes – Getting the right speed and torque
- Motor Heat
- Motor Drive – What is Pulse Width Modulation (PWM)

### **Chapter 2, Talon SRX – 52 min**

- Connecting to a Talon SRX
- Communicating with a Talon SRX
- Talon blink codes
- Talon versions and firmware
- Talon control modes
- Talon Velocity mode
- Talon Parameters

### **Chapter 3, Talon Encoders and Sensors – 17 min**

- Quadrature Encoders
- Analog Encoders
- Sentinel Interface Board

#### **Chapter 4, Control Loops – 49 min**

Open Loop control

Closed Loop control

PID control

What is P – Proportional

P only live demo – Walk the line

PI – add the Integrator

PID – add a differentiator

PID + F – add Feed Forward

#### **Chapter 5, Live Tuning Examples part 1 – 51 min**

Stryke Force tuning tools

Tuning a no load CIM

Checking the axis open loop – confirm you understand your physical plant

Close the loop

Tuning F

Tuning P

#### **Chapter 6, Live Tuning Examples part 2 – 55 min**

Tuning I

Tuning I zone

Tuning D

Talon Velocity Filters and other high-performance tricks

Velocity Filter effect example

#### **Chapter 7, Live Tuning Examples part 3 – 40 min**

Adding big inertia to the velocity loop

Adding a bunch of drag

#### **Chapter 8, Live Tuning Examples part 4 – 57 min**

Tuning a position loop

Motion Magic

**Chapter 9, Quick Start Tuning Guide and Q&A – 38 min**

Quick Start Tuning guide

Can you graph data during a match

How long does it take to tune a PID loop

How do you install the Stryke Force Tuning Tools

Does Stryke Force use 775s for everything

Stryke Force design process

NavX and field-oriented drive

Sentinel Interface Board

Digital Servos

Vision systems – Stryke Force SteamWorks shooter

Wrap-up