

#1

Topic	Video	Link	Notes
Wiring	How to wire up and use LEDs (explained for beginners)	https://www.youtube.com/watch?v=Z4A2L4ahl2	<ul style="list-style-type: none"> - Make sure you are aware which side of the LED in + and – - Know the voltage and resistance rating of the LED before starting - Always do the math before implementing LEDs to avoid burning out any of the LEDs
Remote controller	How to Setup FS-iA6B with iBUS - Wizard X220 - Flysky FS-i6X (SPracing F3 Flight Controller)	https://www.youtube.com/watch?v=ytxZWbPOHJU	<ol style="list-style-type: none"> 1. Plug the servo connector cable into the Rx ibus servo port 2. Plug the other end of the cable into the flight controller port 3. Set the transmitter Rx into setup to connect it to the ibus 4. In the betaflight set the UART3 to the serial RX and save it 5. Configure the serial-based receiver to the ibus and save it 6. Remove the propellers => connect the battery => test the function in reviver tab
PID Tunning	Introduction to PID Control	https://www.youtube.com/watch?v=VzHpLjkeZ8	<ul style="list-style-type: none"> - P = proportional control => directly proportional to the error and leads to steady state error - I = integrator => continuously eliminates steady-state errors - D = derivative => Controls Damping and smoothness
Motor	How to control a DC motor by FlySky RC – FS i6x using Arduino	https://www.youtube.com/watch?v=LmyV9dwtpMP8	<ol style="list-style-type: none"> 1. Make sure the power source you are using is enough for the motor being used 2. Make sure all wiring is completely correct 3. Ensure compatibility between all components 4. Use an easy to use code to test and understand the use of the motor 5. Then modify the code to desired application
Troubleshoot	How can I read a Drone's Telemetry with Python and Dronekit?	https://www.youtube.com/watch?v=CZ8LHeGIgE	<ul style="list-style-type: none"> - Understand error codes/ outputs of the arduino program and Remote Controller - Understand and implement listeners to make troubleshooting easier - Understand the communication language of the software you are using

#2

$$C(s) = \frac{1}{s} \frac{5}{(s+5)(s+6)} = \frac{5}{s(s+5)(s+6)} = \frac{k_1}{s} + \frac{k_2}{s+5} + \frac{k_3}{s+6}$$

$$C(s) = \frac{(s+5)(s+6)k_1}{s(s+5)(s+6)} + \frac{s(s+6)k_2}{s(s+5)(s+6)} + \frac{s(s+5)k_3}{s(s+5)(s+6)}$$

$$C(s) = \frac{(s^2 + 11s + 30)k_1}{s(s+5)(s+6)} + \frac{(s^2 + 6s)k_2}{s(s+5)(s+6)} + \frac{(s^2 + 5s)k_3}{s(s+5)(s+6)}$$

$$C(s) = \frac{(k_1 + k_2 + k_3)s^2 + (11k_1 + 6k_2 + 5k_3)s + 30k_1}{s(s+5)(s+6)} = \frac{5}{s(s+5)(s+6)}$$

$$30k_1 = 5 \Rightarrow k_1 = \frac{5}{30} = \frac{1}{6}$$

$$k_1 + k_2 + k_3 = 0 \Rightarrow k_2 = -\frac{1}{6} - k_3$$

$$11k_1 + 6k_2 + 5k_3 = 0 \Rightarrow 11\left(\frac{1}{6}\right) + 6\left(-\frac{1}{6} - k_3\right) + 5k_3 = 0 \Rightarrow \frac{11}{6} - 1 - 6k_3 + 5k_3 = 0$$

$$k_3 = \frac{5}{6}$$

$$k_2 = -\frac{1}{6} - \frac{5}{6} = -1$$

$$C(s) = \frac{1/6}{s} + \frac{-1}{s+5} + \frac{5/6}{s+6}$$

$$C(t) = \frac{1}{6} - e^{-5t} + \frac{5}{6}e^{-6t}$$