

# #1

Topic	Video	Link	Notes
Wiring	How to wire up and use LEDs (explained for beginners)	<a href="https://www.youtube.com/watch?v=-Z4A2L4ahI2">https://www.youtube.com/watch?v=-Z4A2L4ahI2</a>	<ul style="list-style-type: none"><li>- Make sure you are aware which side of the LED is + and -</li><li>- Know the voltage and resistance rating of the LED before starting</li><li>- Always do the math before implementing LEDs to avoid burning out any of the LEDs</li></ul>
Remote controller	How to Setup FS-iA6B with iBUS - Wizard X220 - Flysky FS-i6X (SPacing F3 Flight Controller)	<a href="https://www.youtube.com/watch?v=yixZWbFOIU">https://www.youtube.com/watch?v=yixZWbFOIU</a>	<ol style="list-style-type: none"><li>1. Plug the servo connector cable into the Rx iBus servo port</li><li>2. Plug the other end of the cable into the flight controller port</li><li>3. Set the transmitter Rx into setup to connect it to the iBus</li><li>4. In the betaflight set the UART3 to the serial RX and save it</li><li>5. Configure the serial-based receiver to the iBus and save it</li><li>6. Remove the propellers =&gt; connect the battery =&gt; test the function in reviver tab</li></ol>
PID Tunning	Introduction to PID Control	<a href="https://www.youtube.com/watch?v=VzHpLiKeZ8">https://www.youtube.com/watch?v=VzHpLiKeZ8</a>	<ul style="list-style-type: none"><li>- P = proportional control =&gt; directly proportional to the error and leads to steady state error</li><li>- I = integrator =&gt; continuously eliminates steady-state errors</li><li>- D = derivative =&gt; Controls Damping and smoothness</li></ul>
Motor	How to control a DC motor by FlySky RC – FS i6x using Arduino	<a href="https://www.youtube.com/watch?v=LmyV9dwtMP8">https://www.youtube.com/watch?v=LmyV9dwtMP8</a>	<ol style="list-style-type: none"><li>1. Make sure the power source you are using is enough for the motor being used</li><li>2. Make sure all wiring is completely correct</li><li>3. Ensure compatibility between all components</li><li>4. Use a easy to use code to test and understand the use of the motor</li><li>5. Then modify the code to desired application</li></ol>
Troubleshoot	How can I read a Drone's Telemetry with Python and Dronekit?	<a href="https://www.youtube.com/watch?v=CZ8LHgIGhE">https://www.youtube.com/watch?v=CZ8LHgIGhE</a>	<ul style="list-style-type: none"><li>- Understand error codes/ outputs of the arduino program and Remote Controller</li><li>- Understand and implement listeners to make troubleshooting easier</li><li>- Understand the communication language of the software you are using</li></ul>

## #2

$$C(s) = \frac{1}{s} \frac{5}{(s+5)(s+6)} = \frac{5}{s(s+5)(s+6)} = \frac{K_1}{s} + \frac{K_2}{s+5} + \frac{K_3}{s+6}$$

$$C(s) = \frac{(s+5)(s+6)K_1}{s(s+5)(s+6)} + \frac{s(s+6)K_2}{s(s+5)(s+6)} + \frac{s(s+5)K_3}{s(s+5)(s+6)}$$

$$C(s) = \frac{(s^2+11s+30)K_1}{s(s+5)(s+6)} + \frac{(s^2+6s)K_2}{s(s+5)(s+6)} + \frac{(s^2+5s)K_3}{s(s+5)(s+6)}$$

$$C(s) = \frac{(K_1+K_2+K_3)s^2 + (11K_1+6K_2+5K_3)s + 30K_1}{s(s+5)(s+6)} = \frac{5}{s(s+5)(s+6)}$$

$$30K_1 = 5 \Rightarrow K_1 = 5/30 = \frac{1}{6}$$

$$K_1 + K_2 + K_3 = 0 \Rightarrow K_2 = -\frac{1}{6} - K_3$$

$$11K_1 + 6K_2 + 5K_3 = 0 \Rightarrow 11\left(\frac{1}{6}\right) + 6\left(-\frac{1}{6} - K_3\right) + 5K_3 = 0 \Rightarrow \frac{11}{6} - 1 - 6K_3 + 5K_3 = 0$$

$$K_3 = \frac{5}{6}$$

$$K_2 = -\frac{1}{6} - \frac{5}{6} = -1$$

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

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