

# PID Tuning for Rookies

## Overall Strategy

Start with the default settings of the board. In most cases, it's going to fly just fine, unless you have a very non-standard power/weight ratio. Tune **roll** and **pitch** together first, when done, tune **yaw**. Start with **P**, then move on to **I** and lastly tune **D**.

## PROPORTIONAL How fast and responsive the craft is

### When too high

The craft begins to oscillate with high frequency. When just about right, it's common the craft will hover just fine, but oscillate when giving it full throttle. The NAZE32 board has a TPA setting just for that. It defines a ratio how the power should lower as you increase throttle.

### When too low

Controlling the craft will be difficult as all changes will take too long. The controls will feel "mushy". When using hori or angle, the FC will have hard time autolevelling and will look like a drunk person trying to maintain stability.

## Overall Strategy

Try setting power as high as possible, until you get the high frequency oscillations. Then turn it down a notch so they go away. On a NAZE32 you can fine tune that perfect spot with the TPA. All you need to control when tuning P is throttle.

## INTEGRAL How fast it can correct external forces

### When too high

Low frequency oscillations on hover and **throttle up**.

### When too low

When **descending**, the craft bounces around, "wobbles".

## Overall Strategy

If you get bumps when you descent, raise the I until they go away. Note that you descent in forward motion to avoid mistaking low I for landing into "prop wash". While all you need to control when tuning I is the throttle, make sure to move forward when descending to check for low I.

## DERIVATIVE How it nails the target state. "Locked in"

### When too high

The craft becomes unstable, doesn't hold hover, oversteers.

### When too low

After making a turn, the craft bounces back and forth, like a pingpong ball on a table.

## Overall Strategy

Do quick turns to tune D. The craft needs to stop in place when you let go of the stick, not bounce back and forth. Usually pitch will need a higher value as most quads have weight at the front and back rather than sides.