



These Are The 6 Types Of Aircraft Stability

By [Colin Cutler](#) | 10/26/2023 | [Previous](#) | [Next](#)



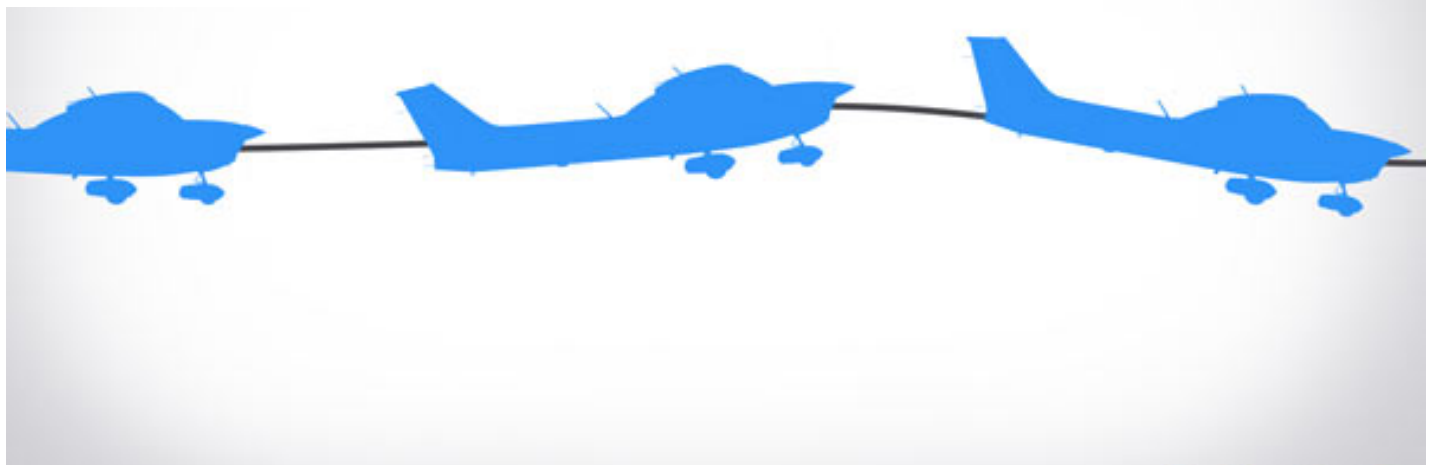
When it comes to aircraft stability, there are two primary kinds: static, and dynamic. But they can be broken down even further, and we're going to do that right now...

1) Positive static stability

The first three types of aircraft stability are variations of "static" stability, which is the *initial* tendency of your aircraft to return to its original position when it's disturbed.

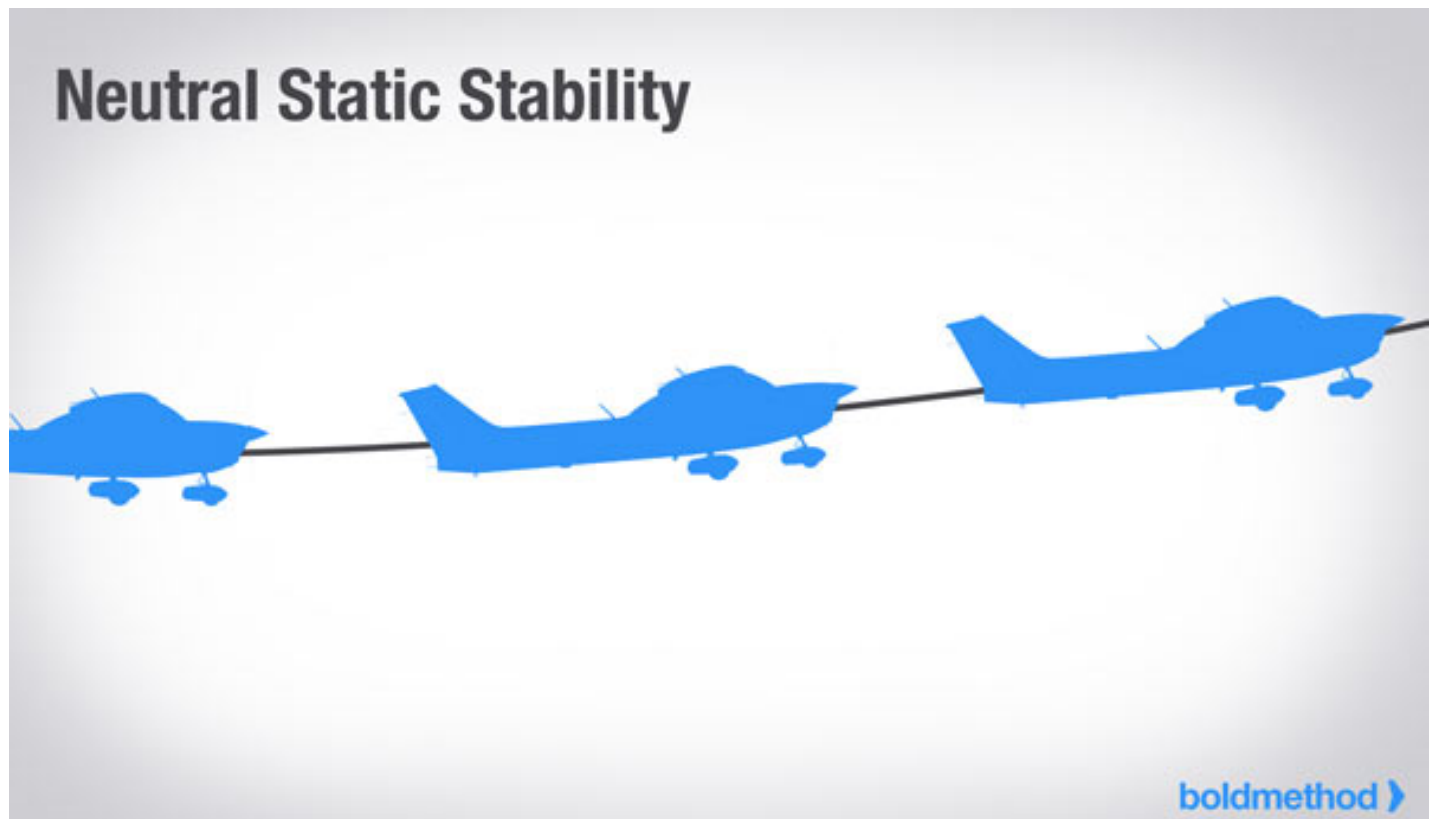
An aircraft that has **positive static stability** tends to return to its original attitude when it's disturbed. Let's say you're flying an aircraft, you hit some turbulence, and your nose pitches up. If you don't touch the controls, your nose lowers on its own, returning to its original attitude. That's positive static stability, and for all you [Cessna](#) and [Piper](#) drivers out there, this is the kind of static stability your airplane has.

Positive Static Stability



2) Neutral static stability

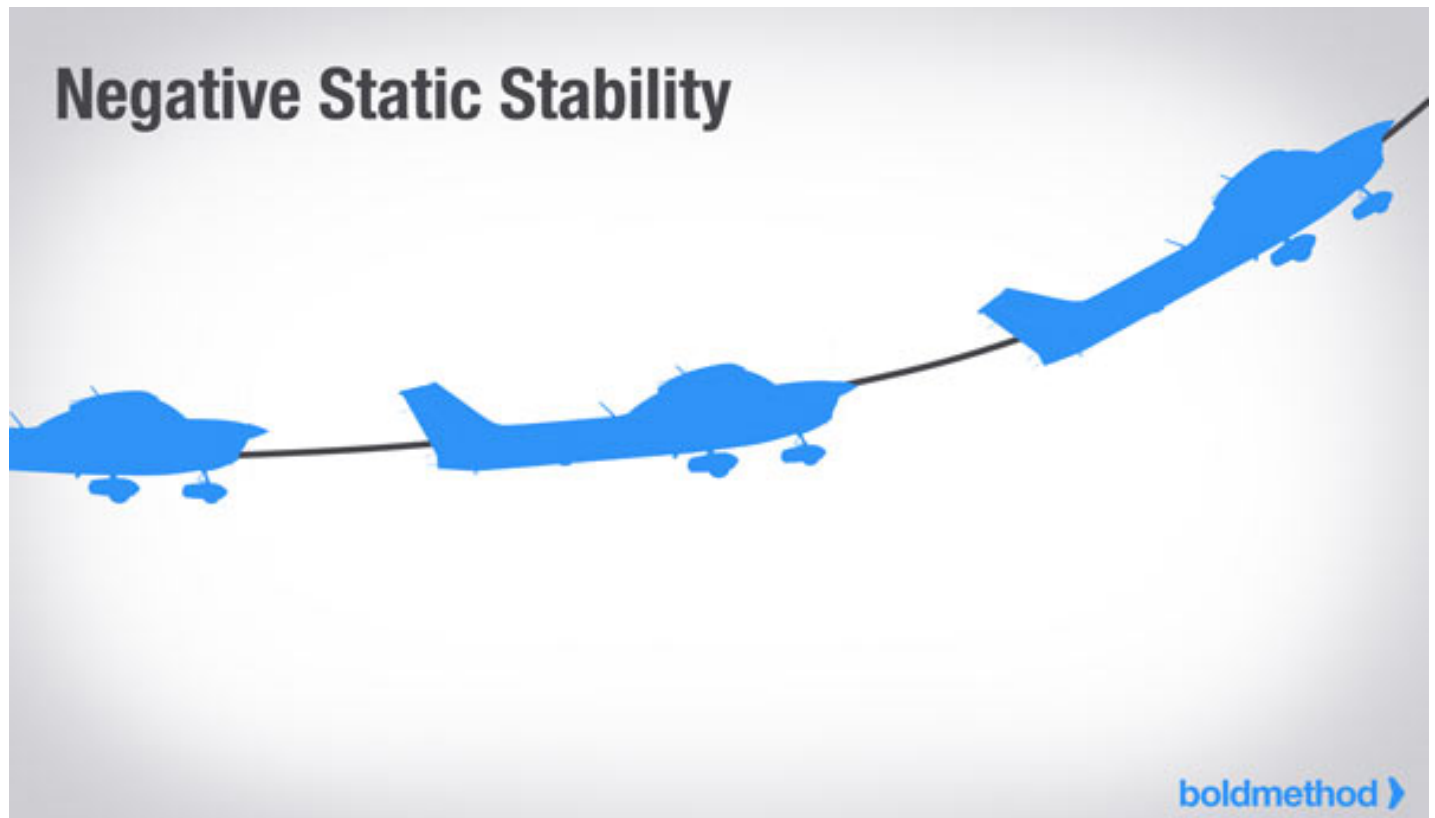
Aircraft that have neutral static stability tend to stay in their new attitude when they're disturbed. For example, if you hit turbulence and your nose pitches up 5 degrees, and then immediately after that it stays at 5 degrees nose up, your airplane has neutral static stability. If you're flying an aerobatic plane, like an [Edge 540](#), this is how your plane will most likely react.



3) Negative static stability

Let's wrap up static stability with the "negative" kind. Aircraft that have negative static stability tend to continue moving away from their original attitude when they're disturbed. For example, if you hit turbulence and your nose pitches up, and then immediately continues pitching up, you're airplane has negative static stability. *For most aircraft, this*

is a very bad design characteristic.



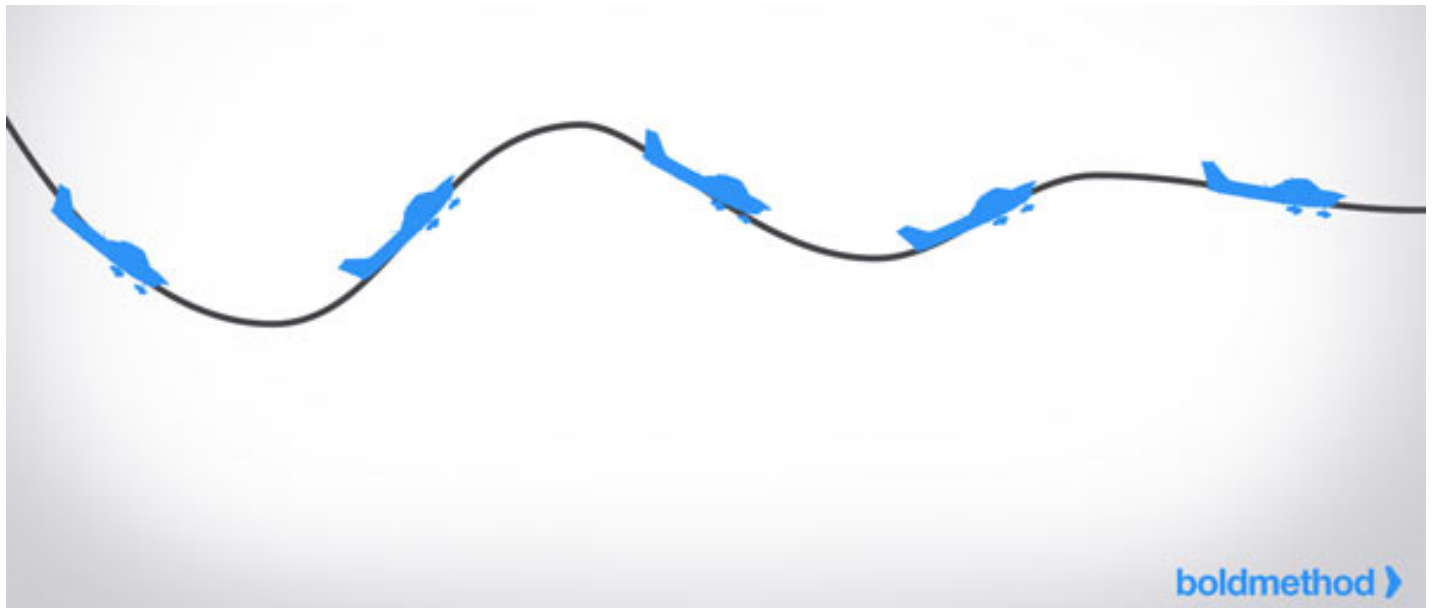
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4) Positive dynamic stability

Now that you've gotten static stability down, let's talk dynamic. Dynamic stability is how your airplane responds to a disturbance **over time**.

Aircraft with positive dynamic stability have oscillations that dampen out over time. The [Cessna 172](#) is a great example. If your 172 is trimmed for level flight, and you pull back on the yoke and then let go, the nose will immediately start pitching down. Depending on how much you pitched up initially, the nose will pitch down slightly nose low, and then, over time, pitch nose up again, but less than your initial control input. Over time, the pitching will stop, and your 172 will be back to its original attitude.

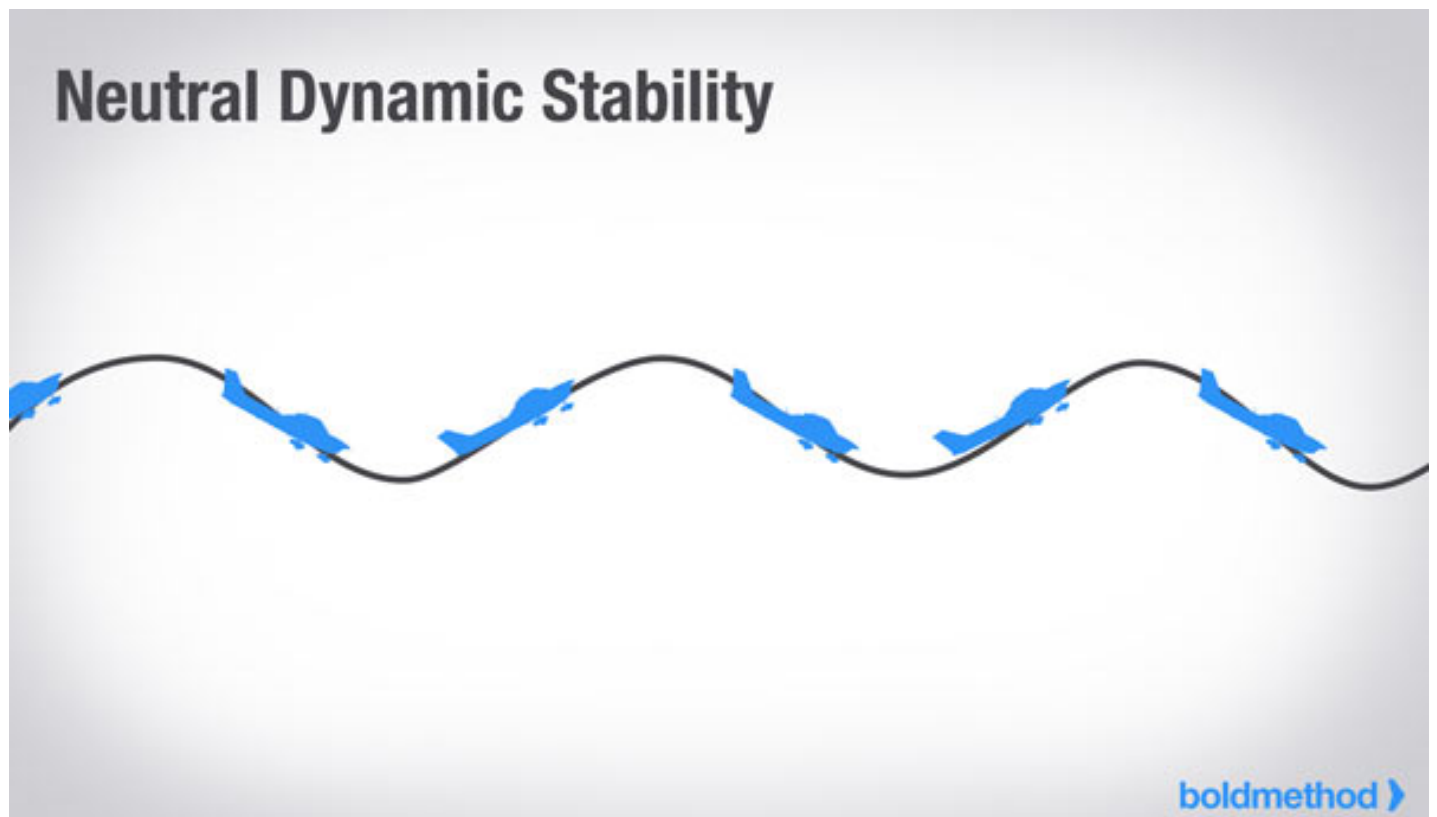
Positive Dynamic Stability



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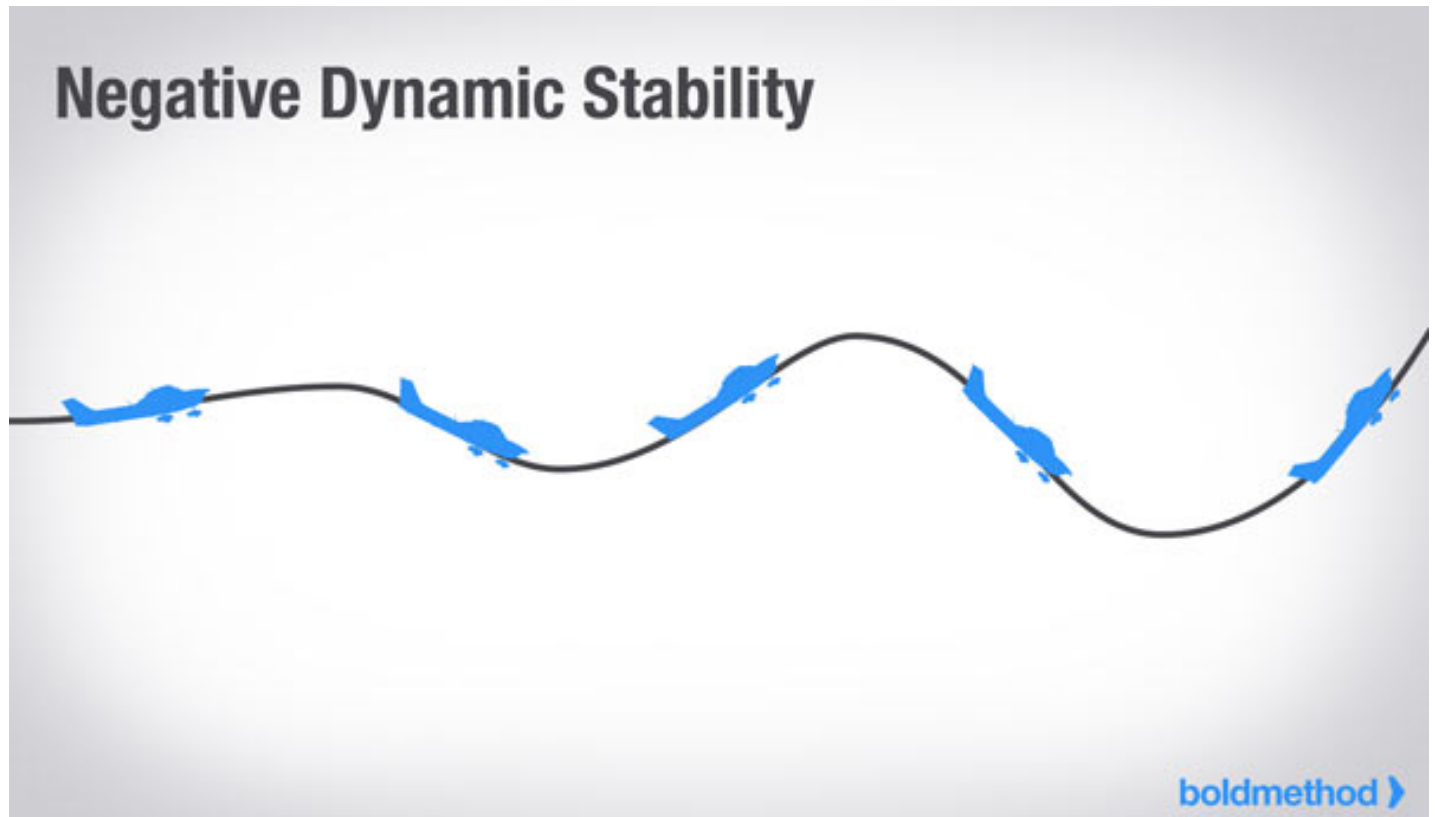
5) Neutral dynamic stability

Aircraft with neutral dynamic stability have oscillations that never dampen out. As you can see below, if you pitch up a trimmed, neutrally dynamic stable aircraft, it will pitch nose low, then nose high again, and the oscillations will continue, in theory, forever.



6) Negative dynamic stability

Aircraft with negative dynamic stability have oscillations that get worse over time. The diagram below pretty much sums it up. Over time, the pitch oscillations get more and more amplified. *And that's not a good thing.*



So now that you know all 6 types of stability, what type of static and dynamic stability does your airplane have?

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