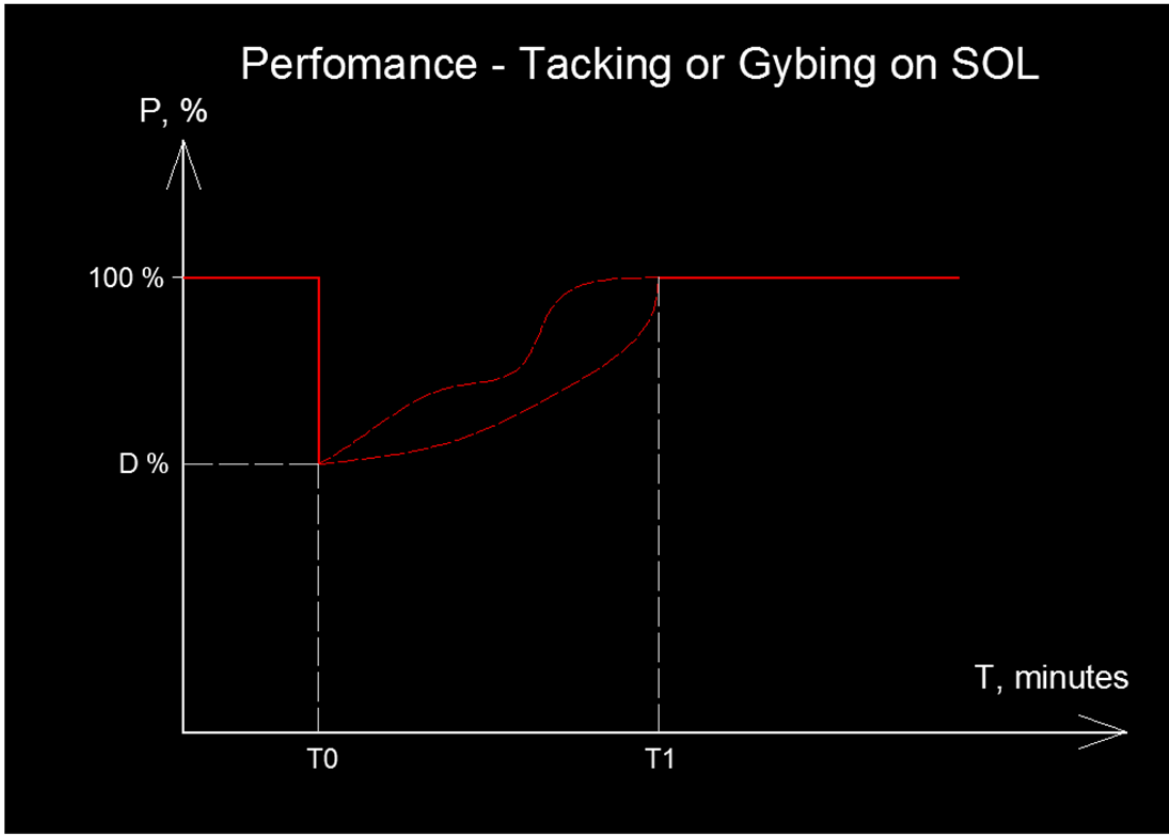
Sir Isaac Newton and Einstein have a glimpse at the SOL boat Performance.

From the Newton's *Philosophiae Naturalis Principia Mathematica* (5 July 1687), where he theorized, namely, about bodies in motion, to the famous Einstein *matter-energie equivalence* formulation ($E = mc^2$), the common denominator was/is mass ("m").

But, what the heck those two persons have to do with the SOL boat Performance?
Some will say: plain nothing, nada, others… we'll see.
Both have two things in common: genius and mass ("m"). Well, Newton had also the "mass" apple episode. Nowadays it would have been a boom.

Performance issues has been talked for a while, namely, on the SOL forum and, today is consensual that the time to recover the magical "100% P" after tacking or gybing some SOL boats is sometimes longer than expected or it should be.
A paradigm of this: the VOR70 SOL version. It's far away from reality that the VOR boat takes 10-15 minutes so long to recover full Performance after tack or gybe, sometimes more after gybing.
If you already saw VOR70 boats maneuvering live you'll easily agree (I actually saw them in Lisboa river Tejo regattas, between the buoys, in the last VOR).
The same happens with MODs 70 because the power of acceleration of these boats is enormous, even in light air (also saw them in the "Route des Princes" river Tejo regattas).

I don't know if the entire SOL fleet has the same function (math expression) for the Performance downgrading/upgrading. Maybe yes.
Anyhow, in generic and graphically terms this is what happens to SOL boats "Performance" when you tack or gybe - see Graph. 1. The **coordinate** axe is "**Performance"** in percentage and the **abscissa** axe is "**Time"** in minutes.



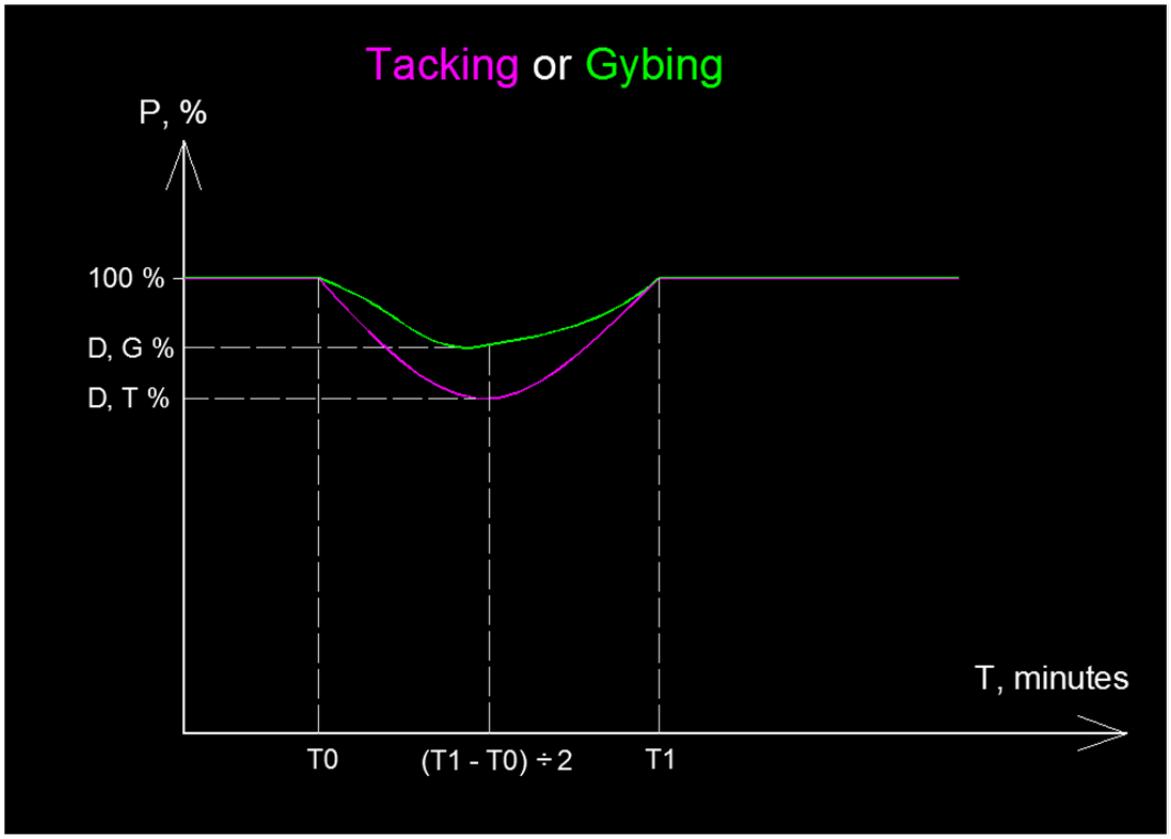
I call "**D %**" the maximum downgrade of Performance in the maneuver.
Between the start of the maneuver, **T0 minutes,** and the end of the Performance full upgrade cycle ("P = 100 %"), **T1 minutes**, I've design #2 possible generic configurations for this part of the downgrading/upgrading "P, %" function as, already mentioned, I don't know the exact behavior of it.

The Performance function affects the boat speed ("BS") during tacks/gybes, first, decreasing BS, and after increasing it. It also acts for a "large" change in boat heading ("HDG").

Others say that the downgrade function acts also as deterrent to the sailor making the “jigsaw” path in the upwind legs.

In the SOL case, the Performance downgrade (“D%” point) takes effect immediately after your action to start the maneuver, not following the previously established relations between TWA/TWS in the Polar data for finding the correct BS during the maneuver - it goes from “100%” to “D%” state like an “on/off” button.

In a real tack/gybe process the Performance behavior is (qualitatively) illustrated in Graph 2.
To my mind, is open to discussion which downgrade is greater - the one for tacking or, for gybing.
Anyhow, it’s appeasing to accept that they are different.



These alternate changes on BS or boat “deceleration” (decreasing of BS) / ”acceleration” (increasing of BS) process during the made maneuver result from, first, the simple process of changing direction in relation to the initial path, and second, from changing the boat engine inputs via the TWA/TWS couple.

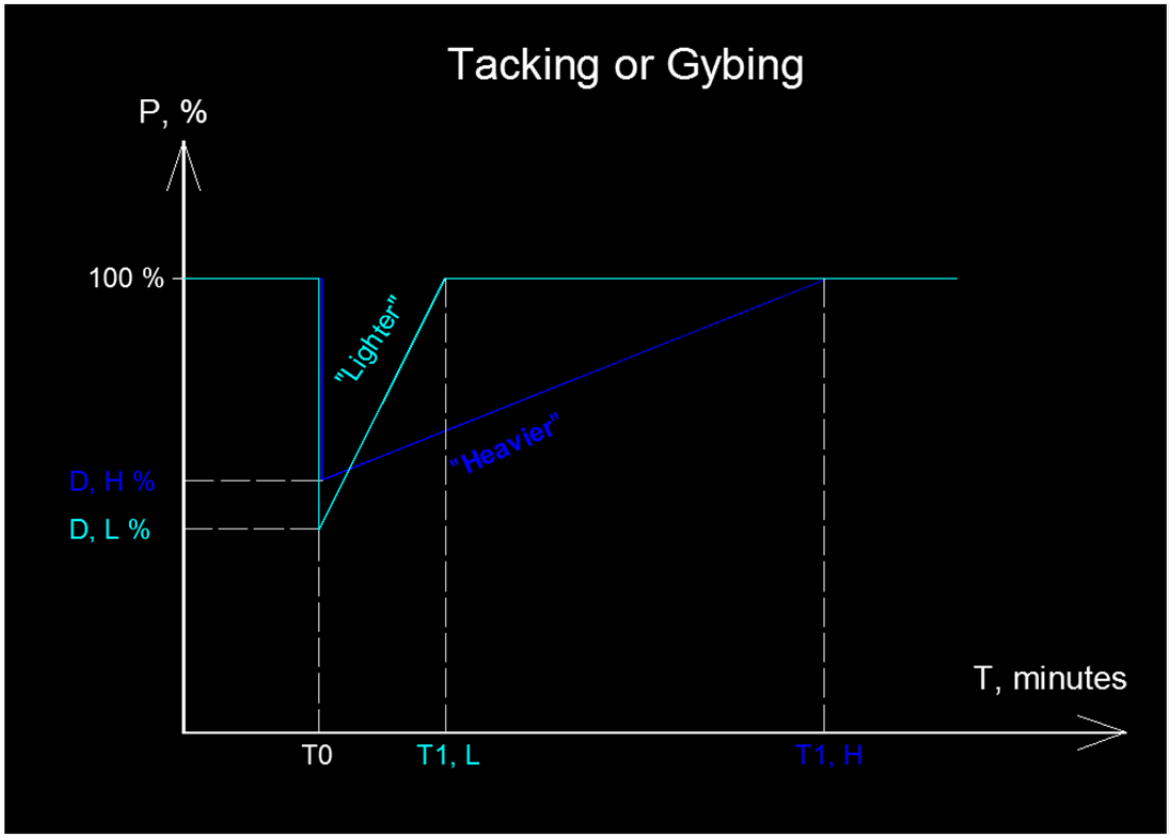
For the same wind conditions is also known that a **smaller** (lighter) boat stops sooner than a bigger one (heavier), but it also **accelerates faster** than the bigger boat. The “lighter” boat has also more “maneuverability”.
It’s right here that the “**mass**” variable is introduced in the equation of the downgrade function.

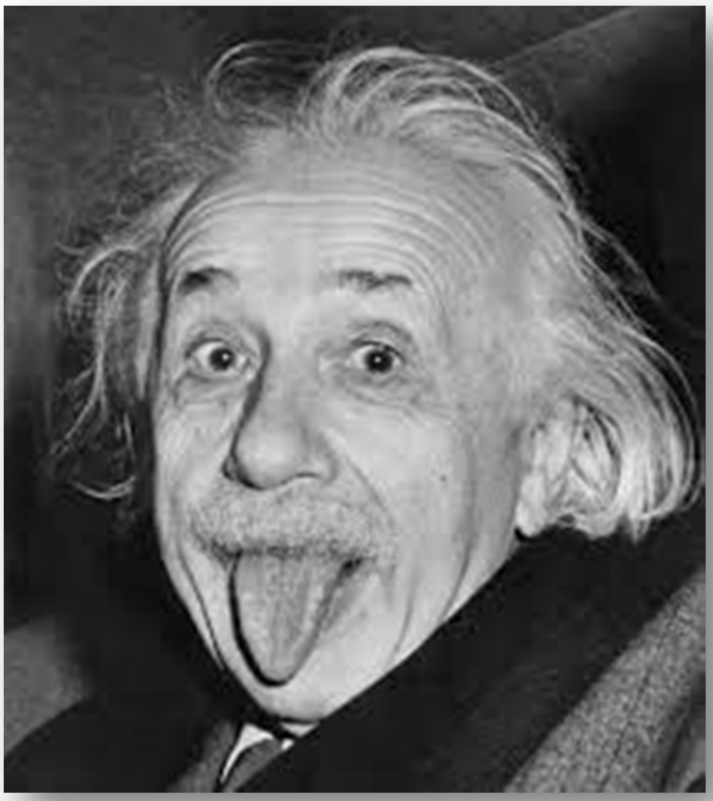
My suggestion to SOL is to make the downgrade of Performance in the maneuver **only dependable on the Length / Weight** of the boat, independently of the TWA and TWS the boat has exactly before the period T0-T1 minutes.

For initials values I suggest for the transient period of a “smaller boat (T1, L - T0) 1 to 2 minutes and for the “heavier” (T1, H - T0) 4 to 5 minutes - see Graph 3.

Also the heavier boat should downgrade less than the lighter one (D, H % > D, L %), let’s say as an example: 95 % vs. 88 %.

For keeping the things simple I suggest for every boat that the upgrade function (from “D, %” to 100%) should be linear in the recovery period (T1-T0).





Einstein after tasting the downgrade Performance function