**Introduction**

This small projects aims to demonstrate how elevation and air temperature, essentially air density, affects the engine power output. As a motorsport engineer, I wanted to show this for F1 vehicles where elevation varies from -28m to 2240m and air temperature from 17 OC tup to 42 OC. As an additional bonus I wanted to provide what kind of change we can expect from 2026 cars with the new regulations compared to the current cars.

This analysis also includes the use of 100% sustainable fuels as they are going to be introduced in 2026. Fuel assumed is ethanol in this case.

**Assumptions and Values**

Values for the calculations are obtained from FIA regulations, my own validated F1 powertrain model from my SAE publication and also from city legends like 50% ηbte. Details of these can be found in the MATLAB code which is attached to the report.

Main assumption in this study is that air enters the chamber at Mach 1 which would be the maximum flow condition. For the flow area, intake valve diameter of 34.5 mm from 2026 regulations is applied. Combustion is also assumed complete with no cyclic variations.