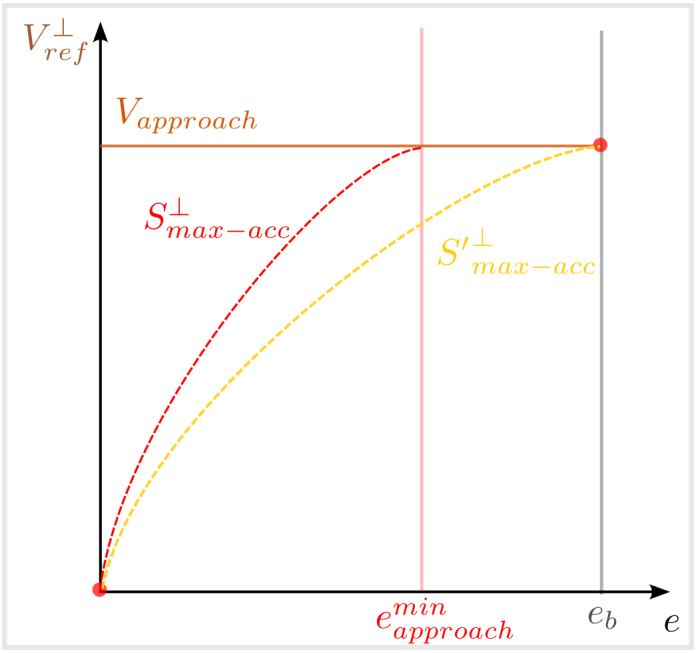
Week 10 Report - Jan 23, 2023 ~ Jan 29, 2023

Acceleration limited velocity curve mathematical formulation

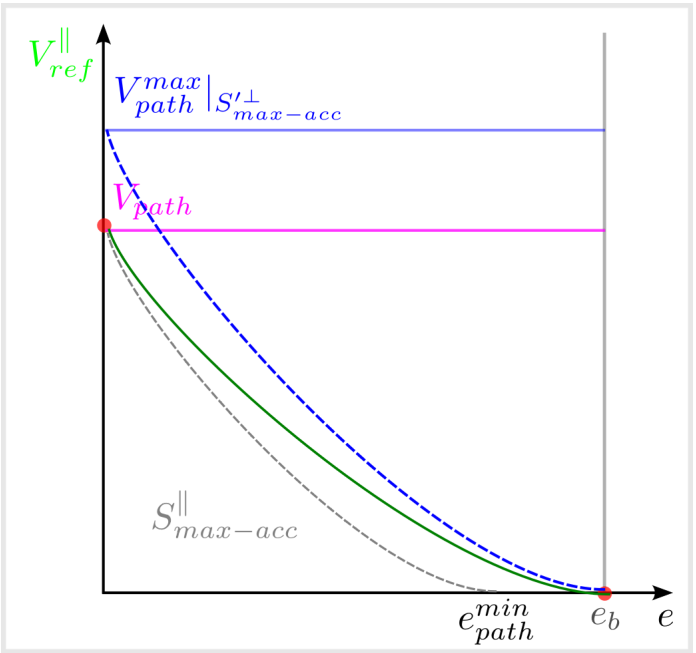
In Week 10, I focused on mathematically formulating the velocity curve constraints, which revealed interesting aspects such as:

- Minimum track error boundary to reduce V_approach to 0 (to be on the path)
- Minimum track error boundary to reach V_path
- Monotonicity constraint, justifying the formulation of V_approach in Week 9, as it should be larger than V_path

👉 This was formulated in LaTeX and can be found here:
[Week10_Accel_Limited_Vel_Curve_Formulation_v1.pdf]



Sample figure showing orthogonal velocity curve



Sample figure showing parallel velocity curve

Prospective

The formulation, however, assumes several factors:

1. Path is a straight line (thus, orthogonal & parallel velocity frames are inertial: doesn't rotate)
2. No wind (the effect of wind on how the *acceleration constraint applies will be more complicated)

Thus, incorporating wind & different path shapes (which correspond to acceleration feed-forward, rotating frame of reference for velocity components) seems necessary for the next week.