

SD2805 : Review - Part I

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1 Technical work

There is a lack of presentation of the problem: the mathematical model wasn't provided, the assumptions made were not discussed and the reasoning as well as the solving methods were not explained.

That being said, the results obtained are reasonable but lacked discussion and comments. The altitude and Mach number discretizations should be refined to obtain smoother curves and a more precise ceiling, the actual ceiling seems to be cropped at 16 km. The second optimal climb problem has a final time of 650s which is longer than the maximum run-time allowed for the afterburners. The approach adopted to solve the first minimum climb time problem isn't optimal since the aircraft spends a lot of time in an area with very low SEP, a dive through the sound barrier should be performed earlier.

2 Content

The abstract doesn't cover the motive, method, key results and main conclusions of the work. The first paragraph of the introduction seems to be exactly the one figuring on the Wikipedia page of the Draken, it wasn't quoted nor provided as a reference. In addition to that, the introduction seems a bit too long compared to the rest of the paper, without addressing the motivations behind this study of the Draken. There doesn't seem to be an explicit link between the different sections of the paper, the transitions are either too abrupt or inexistant. There is a complete lack of equations in the text.

There is a lack of precision, since the altitude at which the maximum Mach number is obtained is not given.

3 Style

The font on the figures is too small, the axis' labels aren't readable. The excess thrust curve's axis should be scaled more properly to take advantage of all the space. The results obtained for angles of attack greater than 15 degrees should

be completely omitted in the graph. The limit itself could be added to the graph instead. There is also a small mistake in the legend regarding the stall line. In the same figure, some lines are solid, others are dashed, there doesn't seem to be any stated motivation for that. The same comments apply for the excess thrust graph with the additional dynamic pressure limits. In the SEP graph, near Mach 1 the labels' density is large, rendering them indistinguishable. This graph could also do with some comments on its shape and how it relates to the two limits. When referring to a figure, it should be explicitly stated, rather than just having the figure number as in section 3.3. The different colors for the energy curves do not render well on-screen and print, especially in the middle of the graph where the dive is performed. Figure 4.1's caption contains a misspelled word. The state variable graphs should be rearranged and the colors should be replaced by different line styles.

Some parts where the Matlab functions used to obtain the results are discussed could be omitted. There are some use cases of "we" in the text, if the aim is to produce an academic paper inspired by the documents available in the AIAA database, such behavior should be avoided. In order for the enumerations to be correct, they should be punctuated with ", ". The first sentence of section 4.1 contains some grammatical mistakes. The section header itself has a wrong target altitude.

The presentation of the minimum time to climb problems could use a table summing up the obtained results, as well as a discussion of the actual optimization beyond only stating a dive with a slope similar to that of an energy height curve. The citations throughout the paper do not seem to work given the number of "???" present in the text.

4 Overall Impression

The paper is incomplete : the problem should be explained further, the methods used presented and motivated and the results discussed.