Calculating the Wing Lift Distribution with the Diederich Method in Microsoft Excel

Task for a Project (Bachelor studies)

Background

The lift distributions on the wing are essential for the induced drag, loads on the wing, therefore, for the wing mass, the stall behavior, and the maximum lift coefficient of the wing. The Diederich method is a semi-empirical method for determining the lift distribution of wings. The method is described in DIEDERICH, Franklin W., 1952. *A Simple Approximate Method for Calculating Spanwise Lift Distributions and Aerodynamic Influence Coefficients at Subsonic Speeds.* Washington: NACA (Technical Note 2751). For a better approach, see TORENBEEK, Egbert, 1988. *Synthesis of Subsonic Airplane Design.* Delft: University Press. Available at: https://bit.ly/3m8KIIV. Priyanka Barua and Dieter Scholz have already created an Excel workbook with the method, this can be used, but it still needs a didactic revision.

Task

The Diederich method should be made available as an Excel spreadsheet, adapted to existing tools for aircraft design at HAW Hamburg. These are the work steps:

- Reworking the mathematical basics of the method.
- Functional and optical revision of the existing Excel workbook.
- Creating a website and a user manual to make the method available online in English.

The report has to be written in English based on German or international standards on report writing.