

NYU DBF Flight Performance Study

Cruise Calculations

References Used:

RC Plane Drag Research

Top 3 Design Reports (2024-25)

Top 3 Proposals (2024-25)

General Aviation Aircraft Design Textbook

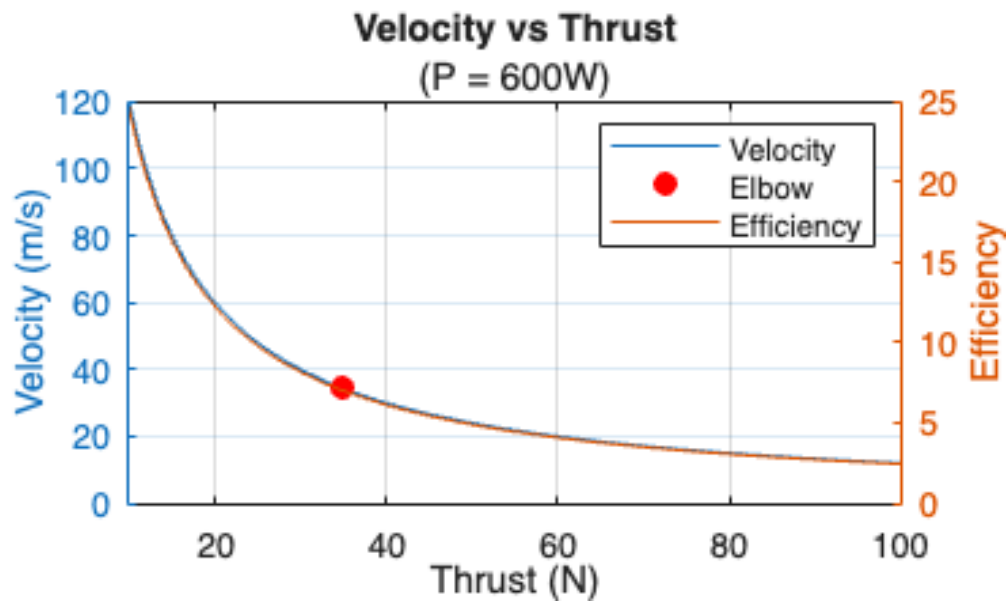
NACA-4412 Optimum Slat & Flap Paper

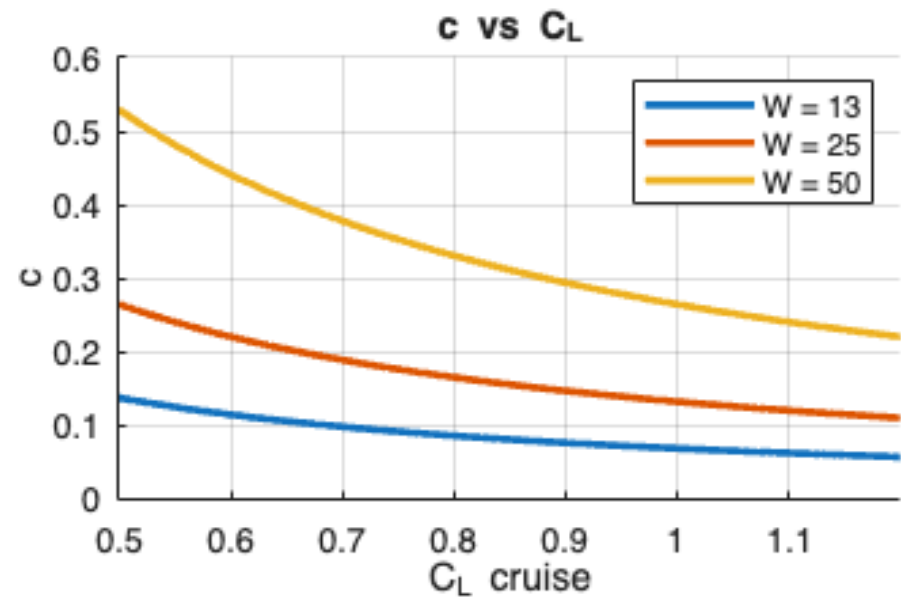
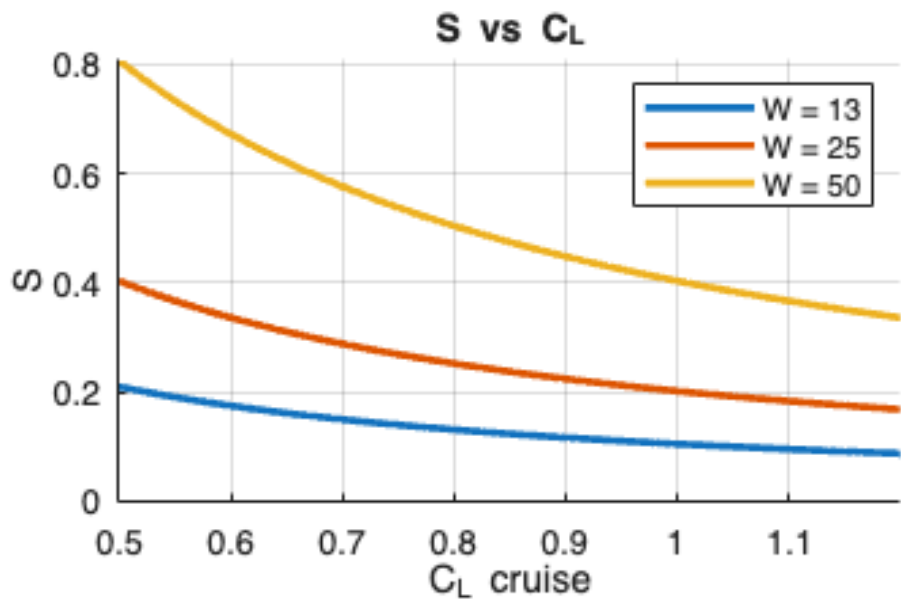
NACA-4412 Flap CFD Study

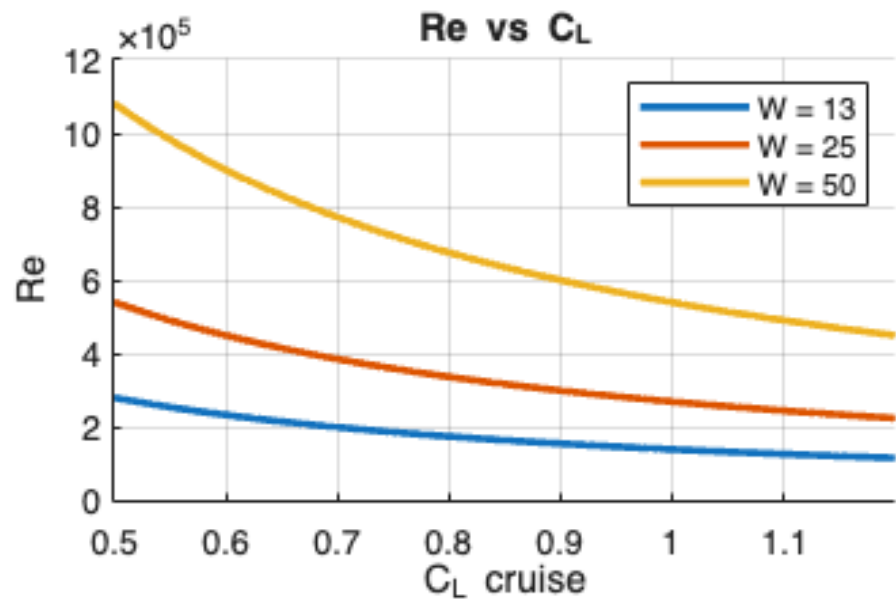
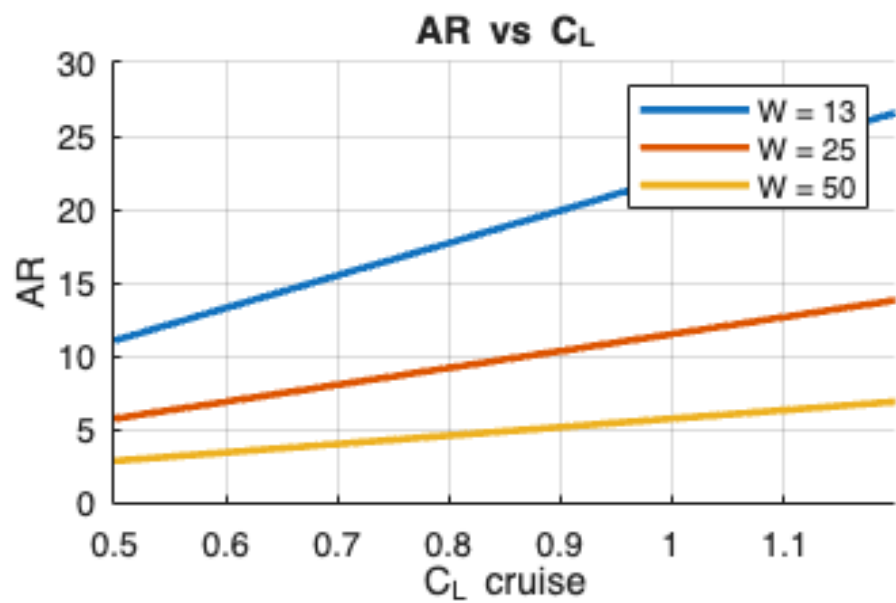
FAA Handbook

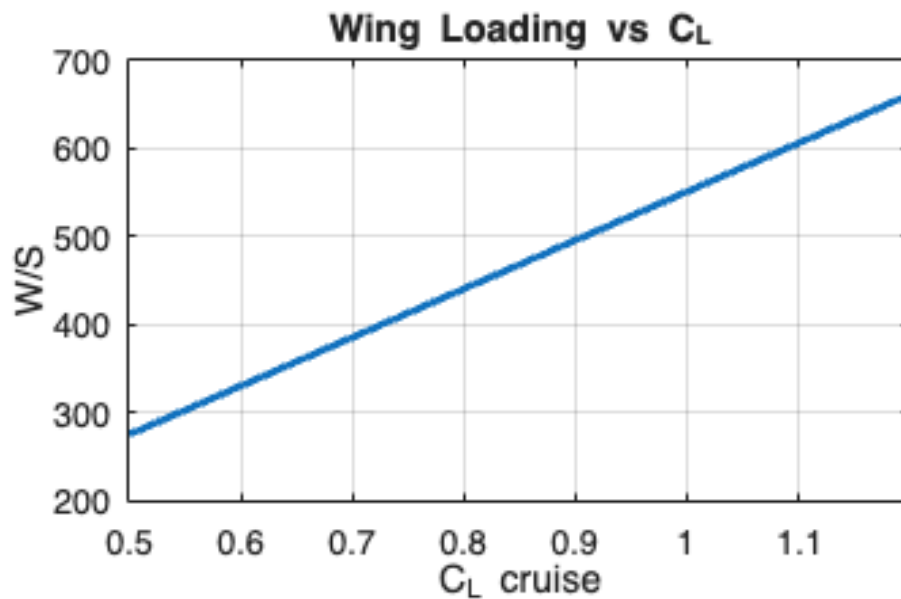
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Preliminary Calculations to Determine Chord Dimension:









Take-Off Calculations

Take-Off Calculations:

13 (lbf) = 21.0183 ft @ 13.2516 m/s Lift Off
 25 (lbf) = 135.0707 ft @ 18.3767 m/s Lift Off
 Cannot Take Off at 50 lbf

Climb Calculations

Climb Calculations:

13 (lbf) = 35 m/s RoC @ 2.6126 s to Altitude
 25 (lbf) = 35 m/s RoC @ 2.6126 s to Altitude
 50 (lbf) = 17.9386 m/s RoC @ 5.0974 s to Altitude

Turn Calculations

Turn Calculations:

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 13 (lbf):
 Bank Angle: 78.463 deg
 Load Factor: 5 G's
 Turn Radius: 61.4402 ft
 Turn Time: 1.9611 s
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 25 (lbf):
 Bank Angle: 74.896 deg
 Load Factor: 3.8377 G's
 Turn Radius: 81.2374 ft
 Turn Time: 2.593 s

~ ~ ~ ~ ~

50 (lbf):

Bank Angle: 58.5909 deg

Load Factor: 1.9188 G's

Turn Radius: 183.7936 ft

Turn Time: 5.8664 s

Lap Time

1 Lap Times:

13 (lbf): 25.1637 s

25 (lbf): 34.7206 s

50 (lbf): -110.0935 s

Touchdown Calculations

Touchdown Calculations:

13 (lbf): 309.4263 ft till stop

25 (lbf): 595.0505 ft till stop

50 (lbf): 1190.101 ft till stop