Weight Model

Spring 16.82

March 3, 2016

Assumptions

1. Mass take off weight is greater than the end of the first segment weight plus that segment fuel weight.
2. The end of each flight segment weight must be greater than the next end of flight segment weight plus the fuel weight of the next flight segment.
3. The end of the last flight segment weight must be greater than the zero fuel weight.

Variables

$W_{begin}[3]$
$W_{end}[3]$
$P_{shaft}[3]$
$MTOW$
$W_{fuel}[3]$
W_{zfw}
$W_{avionics} \leftarrow 2$ lbf
$W_{pay} \leftarrow 10$ lbf
$f_{airframe} \leftarrow 0.3$

Constraints

$$MTOW \geq W_{end(0)} + W_{fuel_{(0)}}$$
$$\begin{bmatrix} W_{end(0)} \geq W_{end(1)} + W_{fuel_{(1)}} \\ W_{end(1)} \geq W_{end(2)} + W_{fuel_{(2)}} \end{bmatrix}$$
$$W_{end(2)} \geq W_{zfw}$$
$$W_{airframe} \geq MTOW f_{airframe}$$
$$W_{zfw} \geq W_{airframe} + W_{avionics} + W_{pay}$$