Aircraft Sizing (MATLAB) Flowchart

Size aircraft

Create Fuel object → Create FuelTank object / Create Engine object → Create Aircraft Object → Call Sizing Tool →

Aircraft.sizing

Define Sizing Loop Properties (Convergence, Jump, Iteration) → If first iteration, define initial TOW guess → Update tube dimensions

Calc. new guess for TOW → Update tube dimensions

Update tube dimensions → Update Wing Properties → Obtain wing mass frac. .wingFrac() → Obtain fuselage mass frac .fusFrac()

FuelTank.weightFrac

Obtain fuselage mass frac .fusFrac() → If not first iteration, obtain fuel tank mass frac. .fuelTankFrac() → Obtain tail, propulsion, furnishings, electrical and undercarriage mass fractions → Obtain L/D and overall efficiency

Check if FuelTank is sphere or cylinder → Estimate gravimetric efficiency

Estimate gravimetric efficiency → (+ fuel mass fraction (prev. iteration)) → Calculate fuel tank mass fraction

Obtain L/D and overall efficiency → Calculate fuel mass fraction (Breguet-Range eq.) → Obtain mass of passengers → Get new MTOW → Calculate delta $TOW_{prev.\ guess} - MTOW_{new\ value}$ → Check for convergence and jump requirement → Converged or max iterations reached?

Converged or max iterations reached? — **No** → Calc. new guess for TOW

Converged or max iterations reached? — **Yes** → End of Sizing