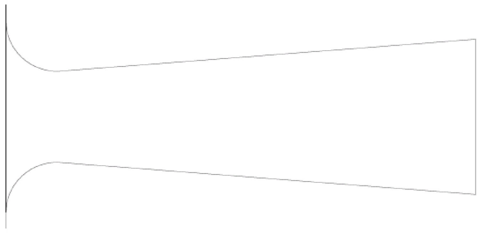
THIS IS AN EXAMPLE OF CALCULATING A ROCKET MOTOR

$F := 50000$	Drag force in (N)	
$m := 80$	Mass flow (kg/s)	$F = m \cdot c2$

$p2 := 101325$	Atmosphere pressure (Pa)
$T2 := 273$	Temperature in the air (K)
$\rho := 1.3$	Density air(kg/m3)
$cp := 1000$	Specific heat capacity for air
$\chi := 1.4$	Kappa for air



CALCULATIONS

$p1 = 6.699 \times 10^{5}$	Pressure in the heat chamber (Pa)
$T1 = 468.313$	Temperature in the heat chamber (K)
$c2 = 624.769$	Speed on the gas (m/s) (must be greater than the air speed)
$D1 = 284.948$	Diameter at the beginning of the thrust nozzle (mm)
$D2 = 354.135$	Diameter at the end of the thrust nozzle (mm)
$L = 439.55277$	The length at the thrust nozzle with an expansion angle of 9 deg (mm)

If you got a low mass flow and you compensated it with a high gas speed at the end of the rocket nozzle, you can minimise the weight on the rocket, and you get a higher effenciy on the rocket. F=m*c2, a low m and a greater c2 and you got the same drag force.

CALCULATION WITH ANOTHER SPEED C2

MassShuttle := 1000	Mass of the shuttle in (kg)
MassFuel := 3000	Mass of the Fuel in (kg)
DragForce := 10000	The drag force for the shuttle in (N)
c2 := 2000	The new thrust nozzle speed (m/s)

CALCULATIONS

Recalculates the mass flow and drag force with respect to that the shuttle loses in weight.

DForce = 16326.5	The dragging force (N)
MFlow = 8.163	The new mass flow (kg/s)
SFWeight = 1306.12	Total weight of fuel + the shuttle (kg)

A calculation of this example above, leads to that you can reduce the fuel about 90% if you rises the speed c2 to 2000 m/s. The mass flow is 8.2 kg/s (10%) and the F=16327 N. I suppose that the shuttle is weighting about 1000 kg and that the fuel reduces with 2700 kg (90%) and the acceleration is still about 2.5 m/s^2. With this example I want to show that you can decrease the fuel with maybe 90% of the today space shuttle. Only working with increasing c2 and decrease massflow.

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