BLAST OFF

VISION

INSPIRING PASSION FOR ROCKETRY AMONG THE YOUNGSTERS

Mentors

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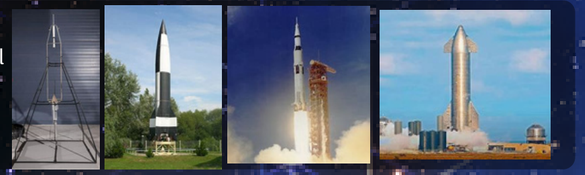
HISTORY OF ROCKETS

1. Robert H Goddard Model
2. V2 Rockets
3. Apollo 11 Programme
4. Starship



ROCKET EQUATIONS

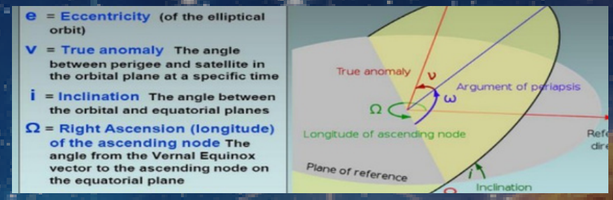
1. $\Delta M/M = 1 - \exp(\Delta v/v_{ex})$
2. $\Delta v = Isp\ g0\ \ln(Mo/Mf)$

COORDINATE SYSTEMS

1. ALT-AZ System
2. RA-DEC System

ORBITAL DYNAMICS

1. Six Keplerian Elements
2. Lagrange points
3. J2 Nodal Regression
4. J2 Apsidal Rotation
5. Hohmann Transfer
6. Graveyard Orbit
7. Gravitational Assist

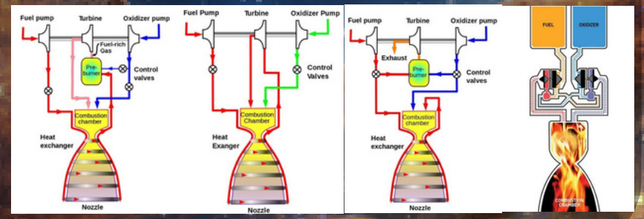


PROPELLANT,ENGINES AND POWER CYCLE

PROPELLANTS
- Liquid
- Solid Monopropellant
- Hypergols

ENGINE PARTS
- Nozzle
- Combustion Chanber
- Injector

COMBUSTION CYCLES
- Gas Generator cycle
- Explander cycle
- Staged combustion
- Full flow staged combustion



TRAGECTORY PLANNING

The five parameters-
- Thrust at five different altitude
- Gravity turn altitude of start and end
- Cone Half Angle
- Rocket Radius
- Initial Wet Mas

ROCKET EQUATIONS

$$\frac{d}{dt}r = r'$$
$$\frac{d}{dt}r' = -\frac{\mu}{r^2} + r\theta^2 + \frac{T(r)-D(r,r')}{m}cos(\alpha(r))$$
$$\frac{d}{dt}\theta = \theta'$$
$$\frac{d}{dt}\theta' = \frac{T(r)-D(r,r')}{r*m}sin(\alpha(r))$$
$$\frac{d}{dt}m = \frac{-T(r)}{I_{sp}*g_o}$$

ASTRO IIT KANPUR

BASIC ANATOMY

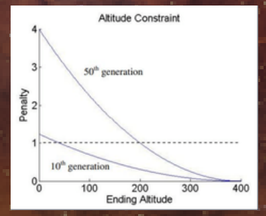
The main parts of a rocket are -
- Nose cone
- Fairing
- Body
- Fins
- Engine

For stability, Cg should always be higher than Cp

SSTO RE-ENTRY HEAT SHIELD

1. SSTO
2. DSTO
3. Re-Entry Maneuver
4. Heat Shields

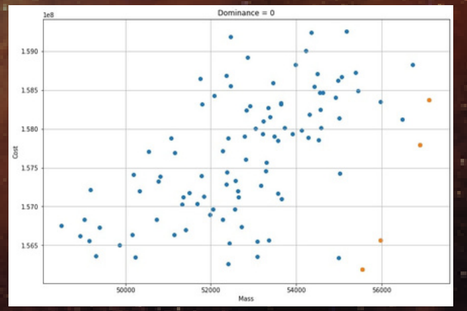
MOGA TO SSTO



Penalty function is defined as a function of the max altitude of the rocket and it's generation. The fitness of the model is then dependent on the penalty and the levels of dominance of the model.

GENETIC ALGORITHM & ROCKET OPTIMIZATION

Genetic algorithms are commonly used to generate high-quality solutions to optimization and search problems (with the aid of fitness function & pareto fronts).



MENTEES:

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