Necessary material parameter for simple simulation: strength analysis

Strength analysis

Input known objects:

- solid part
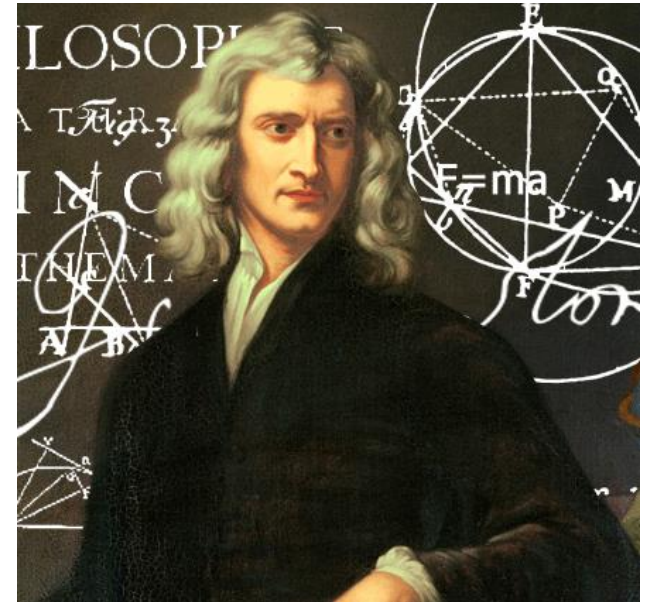
- boundary condition (load, constraint, …)

Output:

- stress and deformation on the volume of the solid part

It is necessary to know the aspects of the emergence of the force load.
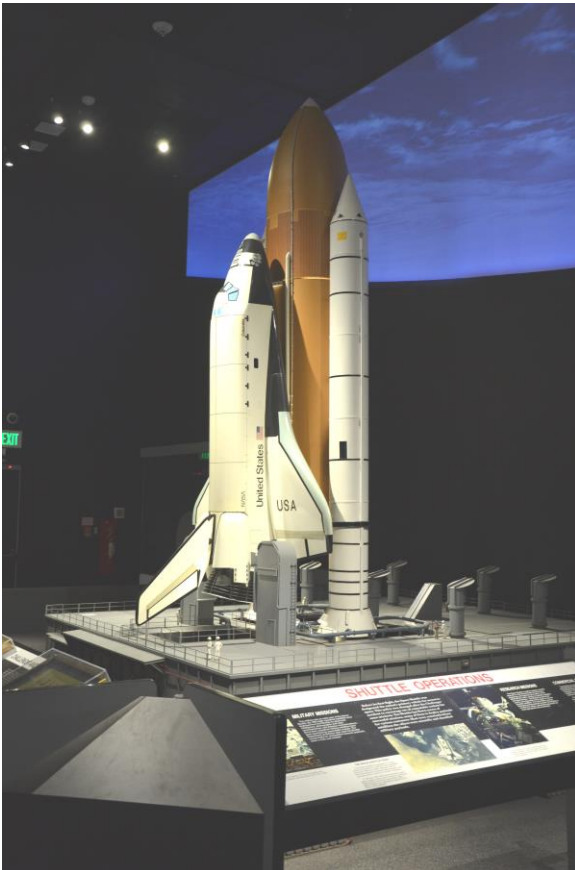
Newton's motion laws

1. NML, Velocity and inertia

2. NML, Forces and acceleration

3. NML, Action and reaction

1. NML, Velocity and inertia

Solid body without external forces:

linear movement and constant velocity or at rest.

2. NML, Forces and acceleration

Force:
F = m . a

Gravity power:
G = m . g

g …….. gravitational acceleration, (direction g ???)

3D model = V: Volume

Weight: $m = V . \rho$
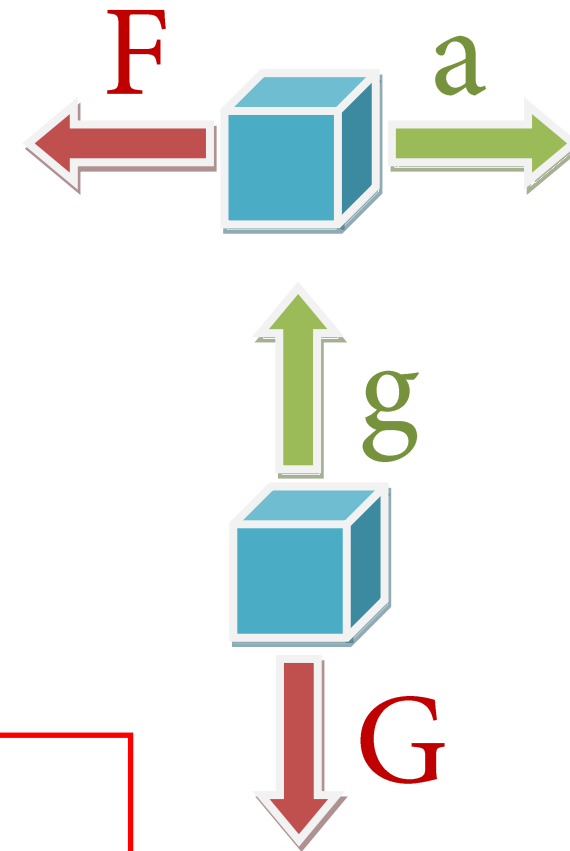
Influence of the force effect:

ρ ………….. **density**

g ………….. **gravitational acceleration**

2. NML

Space Shuttle WC

Material without **g** does´t fall.
Need to suck out the material.

With **g** constantly accelerating.
Speed stabilize rezistace.

Without atmosphere without
resistance.
Light and heavy object
on the Moon.

3. NML, Action and reaction

All forces between two objects exist in equal magnitude and opposite direction.

Fa = -Fr

At rest **Fa+Fr =0**.

Constant velocity: **1. NPZ, without external forces**

Acceleration: **Fa = m.a, force from acceleration**