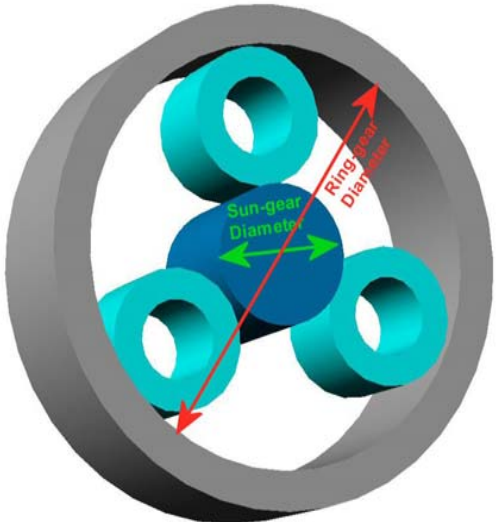
Planetary-gear balanced ratios

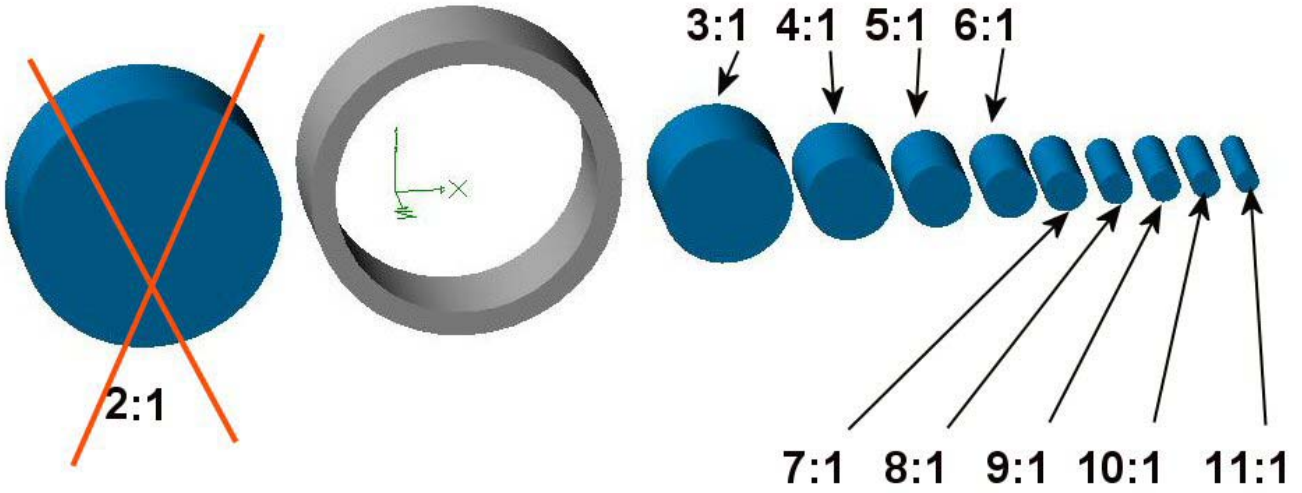
Planetary-gear ratio / optimal performance



$$\text{Ratio} = \frac{\text{Ring gear Diameter}}{\text{Sun gear Diameter}} + 1$$

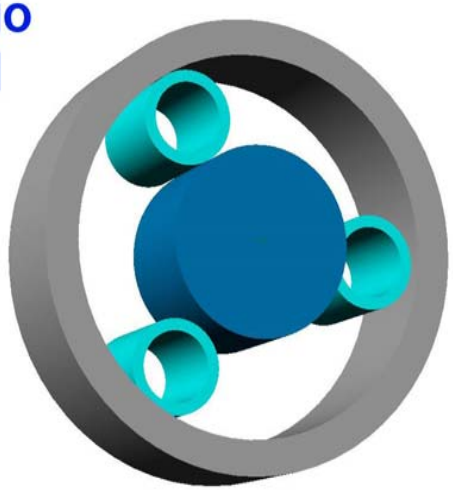
$$\text{Ratio} = \frac{\text{Ring gear number of teeth}}{\text{Sun gear number of teeth}} + 1$$

SUN GEAR Size for different ratios



Planetary -gear ratio / optimal performance

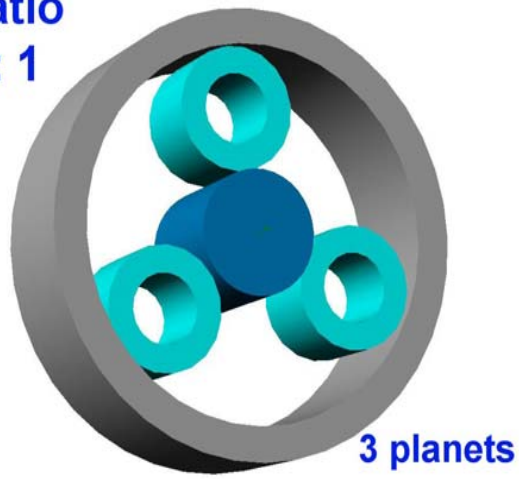
Ratio 3 : 1



Ratio 3:1
Large sun gear / small planet not optimally balanced geometry
Small thin-wall planet and / or small planet bore
➔ small planet bearing, small carrier and small planet bearing

Torque rating limited by planet / planet bearing

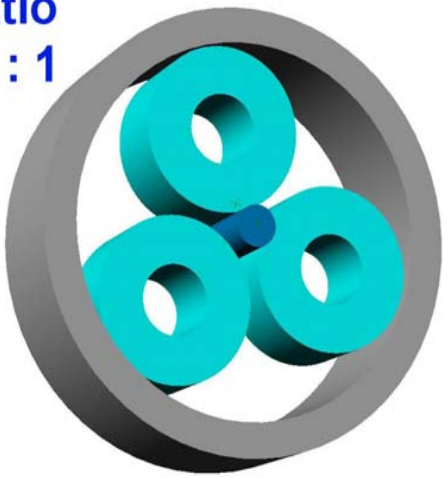
Ratio 4 : 1



Ratio 4:1
Planet and sun same size, well balanced gear geometry,

Optimal torque loading ability high torque rating

Ratio 10 : 1

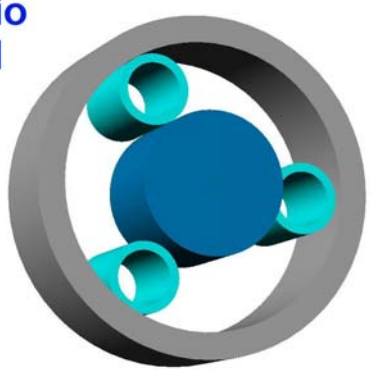


Ratio 10:1
Large planet / tiny sun gear
poorly balanced gear geometry

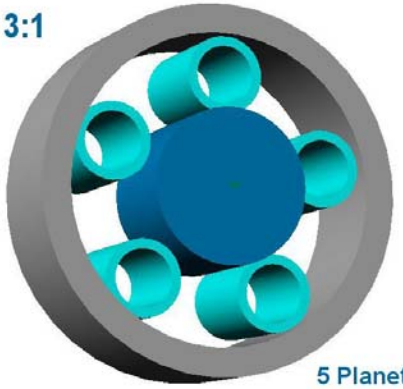
Torque rating strongly limited by the sun gear

Planetary -gear ratio / optimal performance

Ratio
3 : 1



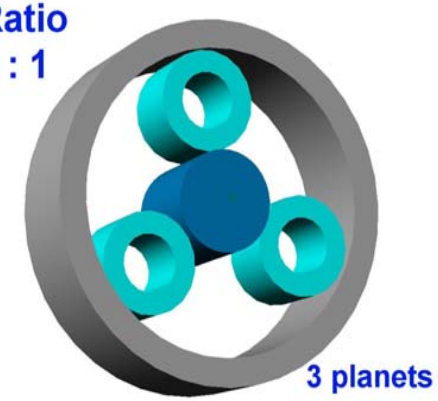
3:1



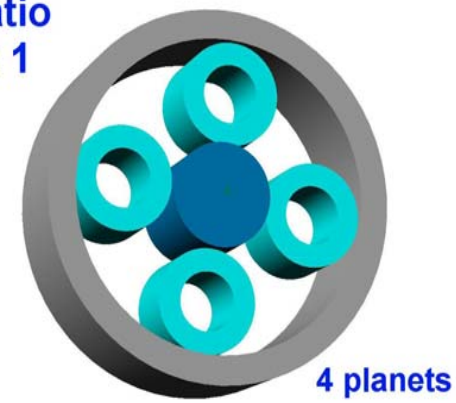
Ratio 3:1
Small Planet size limiting load ability
…….with increased number of planets load ability increase is possible.

Neugart PLE
3x3 = 9:1 output stage

Ratio
4 : 1



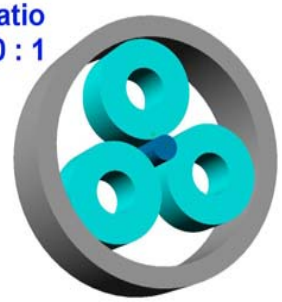
Ratio
4 : 1

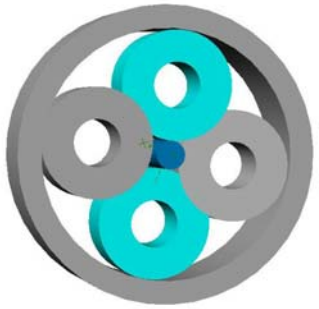


Ratio 4:1
Planet and sun same size, well balanced gear geometry,

Possible to use more than 3 planet gears
Added torque loading capability
PLE design of 2 and 3 stage ratios
3x4 (12:1); 4x4 (16:1) 5:4 (20) ….etc.

Ratio
10 : 1





Ratio 10:1
tiny sun gear large planet gear
poorly balanced gear geometry

Maximum number of planets **3**