

Mortargear planetary compound

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3D CAD files (see Figure 1):

mortargear.FCStd - main assembly, it requires FreeCAD Link Branch

innergear.FCStd - sun gear (red) $z = 12$

midgear(1-3).FCStd - planet gears (green) $z = 24$

fixedgear.FCStd - fixed ring gear (yellow) $z = 60$, also contains *Spreadsheet* object used to adjust gears placement

fixedgear2.FCStd - second fixed ring gear (yellow)

outputgear.FCStd - output ring gear (blue) $z = 59$ (inside)

mortargear.step - full assembly but without feature tree

Since the fixed ring gear and the output ring gear have different number of teeth, their modules have to be different to use shared planet gears.

Formula for the output ring (and planet gears inside teeth) module calculation:

$$m_2 = \frac{m_1 \cdot (z_p + z_s)}{z_{r2} - z_p}$$
$$m_2 = \frac{1 \cdot (24 + 12)}{59 - 24}$$
$$m_2 = 1,029$$

m_1 - module of fixed ring gears, outside planet teeth and sun gear

z_p - number of teeth of planetary gear

z_{r2} - number of teeth of output ring gear

z_s - number of teeth of sun gear

Ratio calculation (if z_{r2} is smaller than z_{r1} , otherwise ratio will be positive):

$$i = - \left(1 + \frac{z_{r1}}{z_s} \right) \cdot z_{r2}$$
$$i = - \left(1 + \frac{60}{12} \right) \cdot 59$$
$$i = -354$$

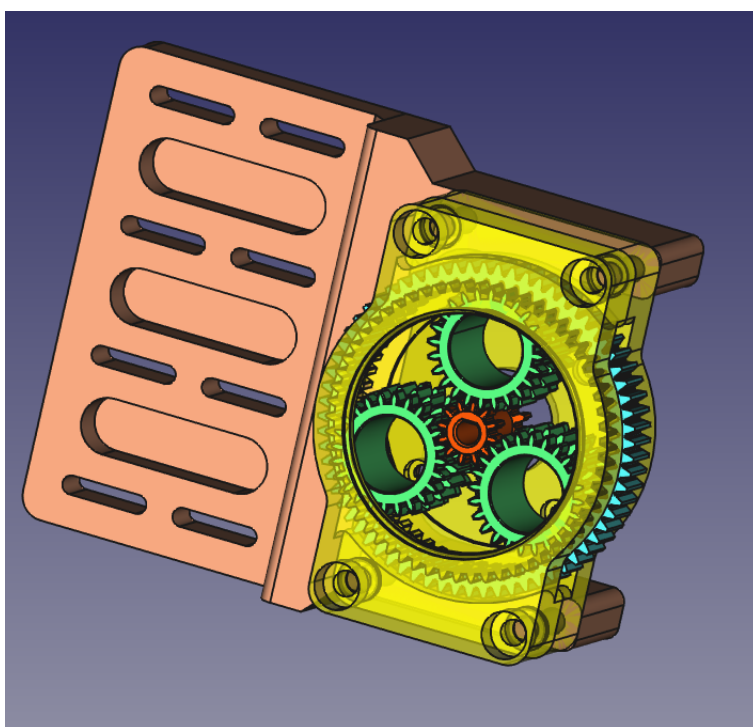


Figure 1: Mortargear assembly