

# **AutoRound**

## **Produktidea Creo Parametric**

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### **1. Introduction**

FEM calculations should provide more valid results in earlier development phases of a component than is possible with sharp-edged models. For this purpose, it is necessary to completely round incompletely modelled housings. This should be done automatically with the AutoRound function, since there is no capacity for manual modelling of these roundings.

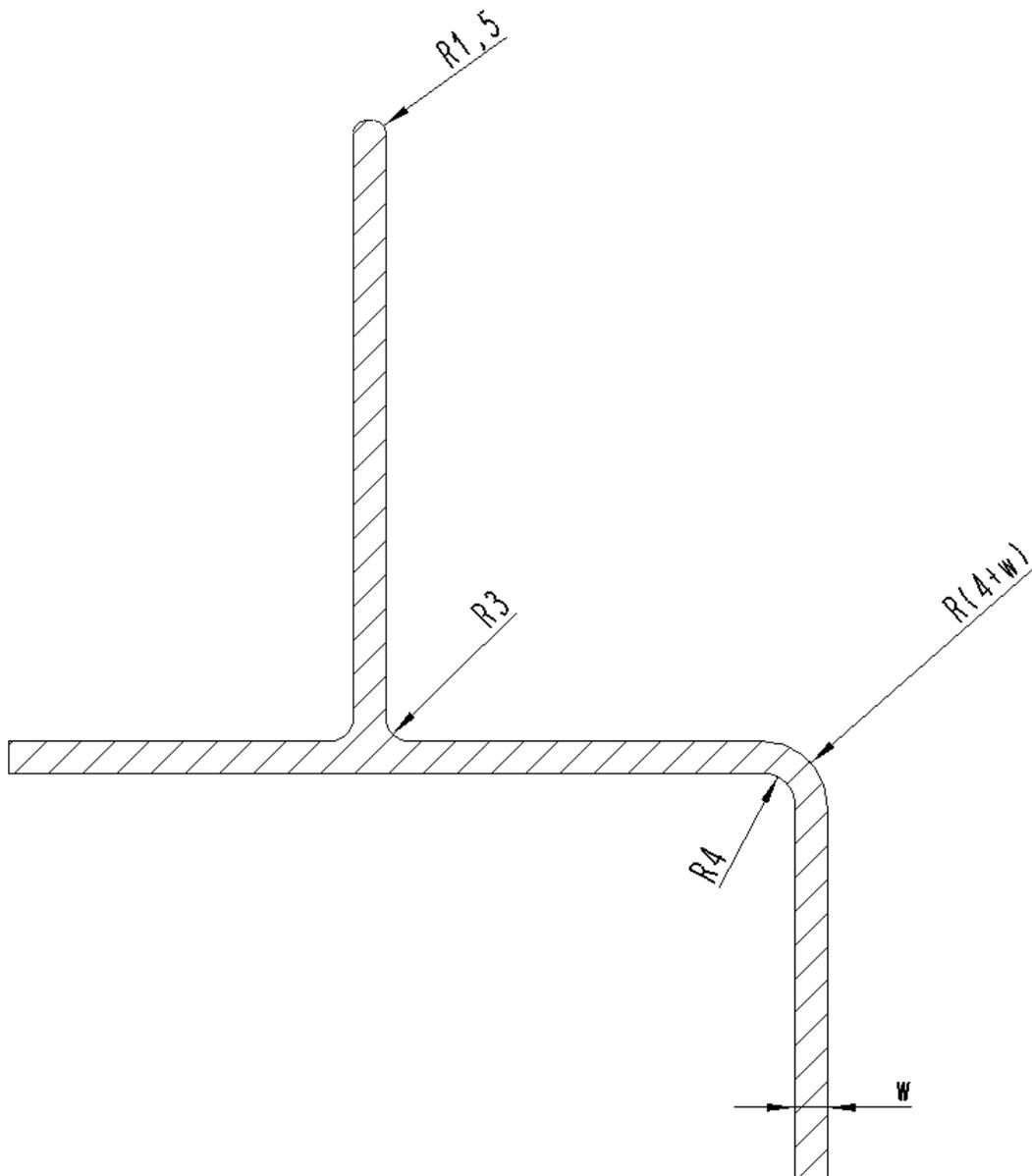
PTC's AutoRound function in Creo Parametric does not meet its expectations.

### **2. Requirements**

1. radius outside rounding = radius inside rounding + wall thickness

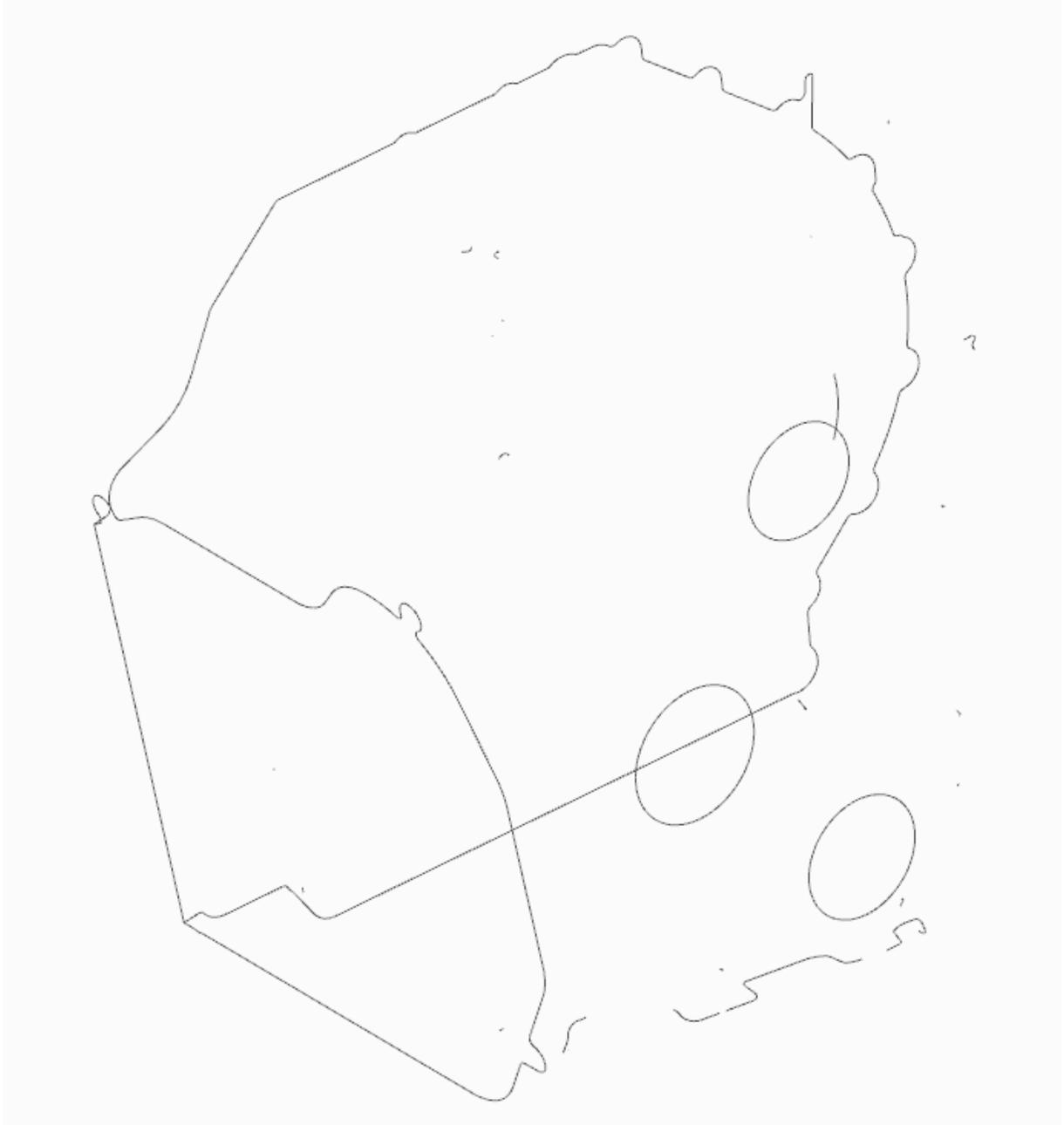
Housing parts are to be rounded automatically according to the present scheme.

- Internal rounding  $R = 3 \text{ mm}$
- Outer rounding  $R = 1.5 \text{ mm}$  (edge rounding on ribbed comb) or
- Outer rounding  $R = 4 \text{ mm} + \text{wall thickness}$  at wall bends

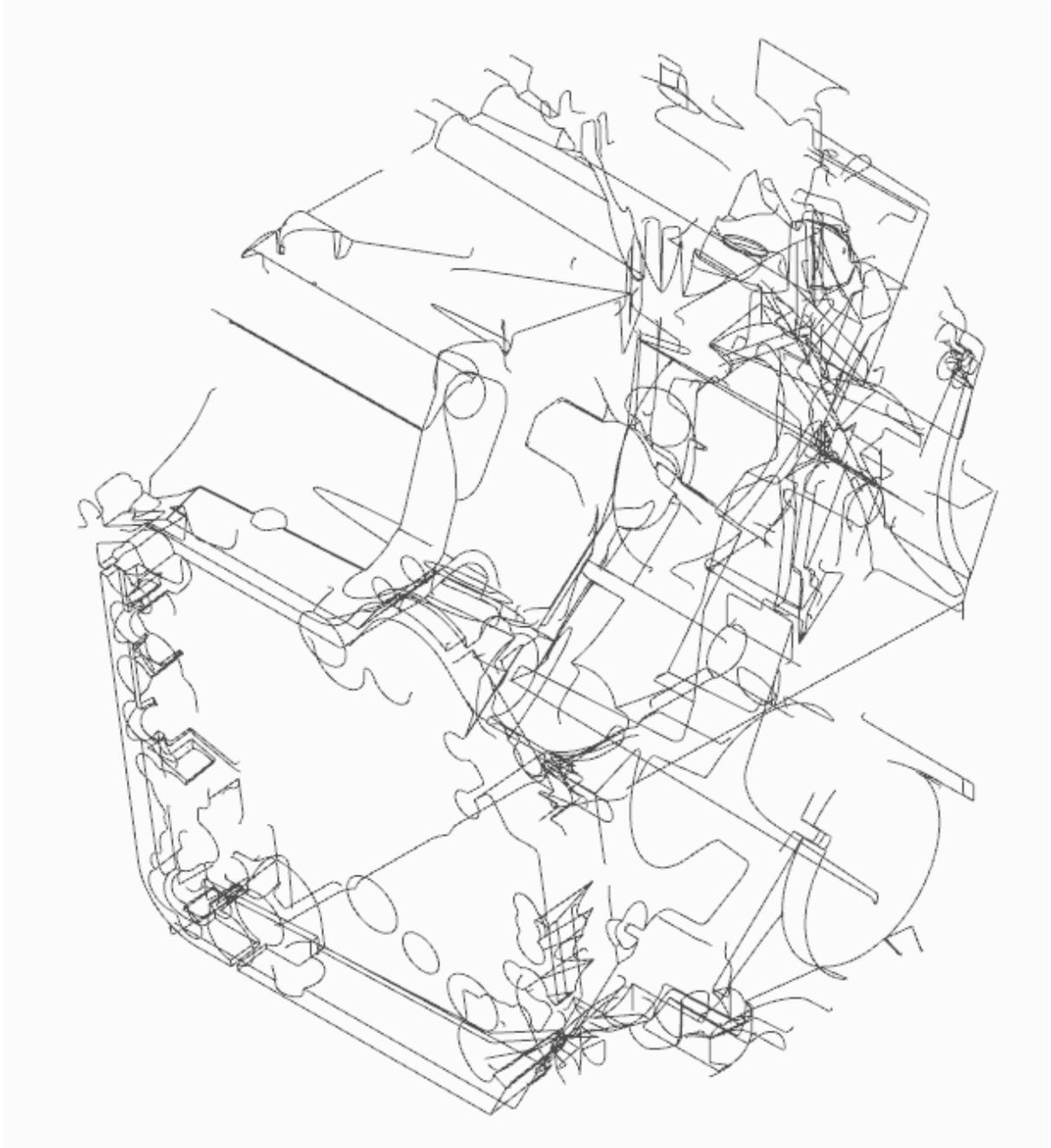


## 2. Rounding off all edges of the model

The housings should be completely rounded. The following pictures first show the result of the manual rounding, then the result of an AutoRound run in wire model mode, tangential edges are not depicted. You can clearly see that the automatically rounded model still has many sharp edges.



**Target:** only a few edges visible

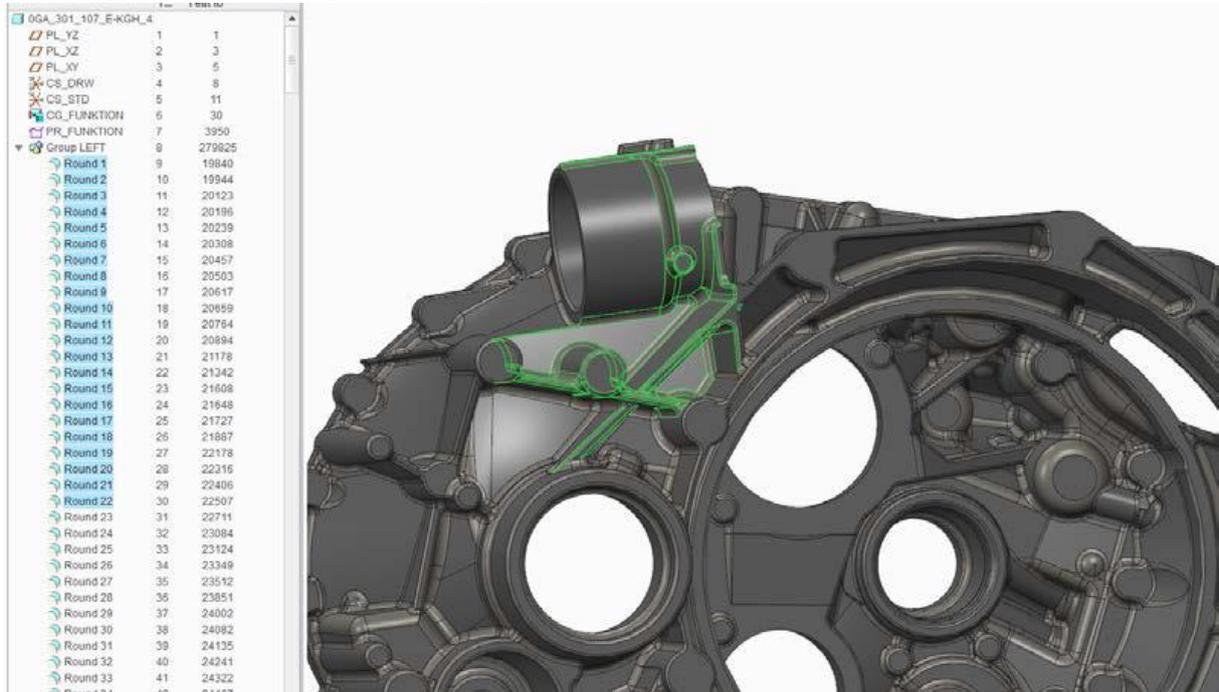


**Is:** many unrounded edges are visible after AutoRound

### 3. Ordered Round Feature

The automatically generated rounding image (= all roundings of a housing) is to be accessible for further manual processing, i.e.:

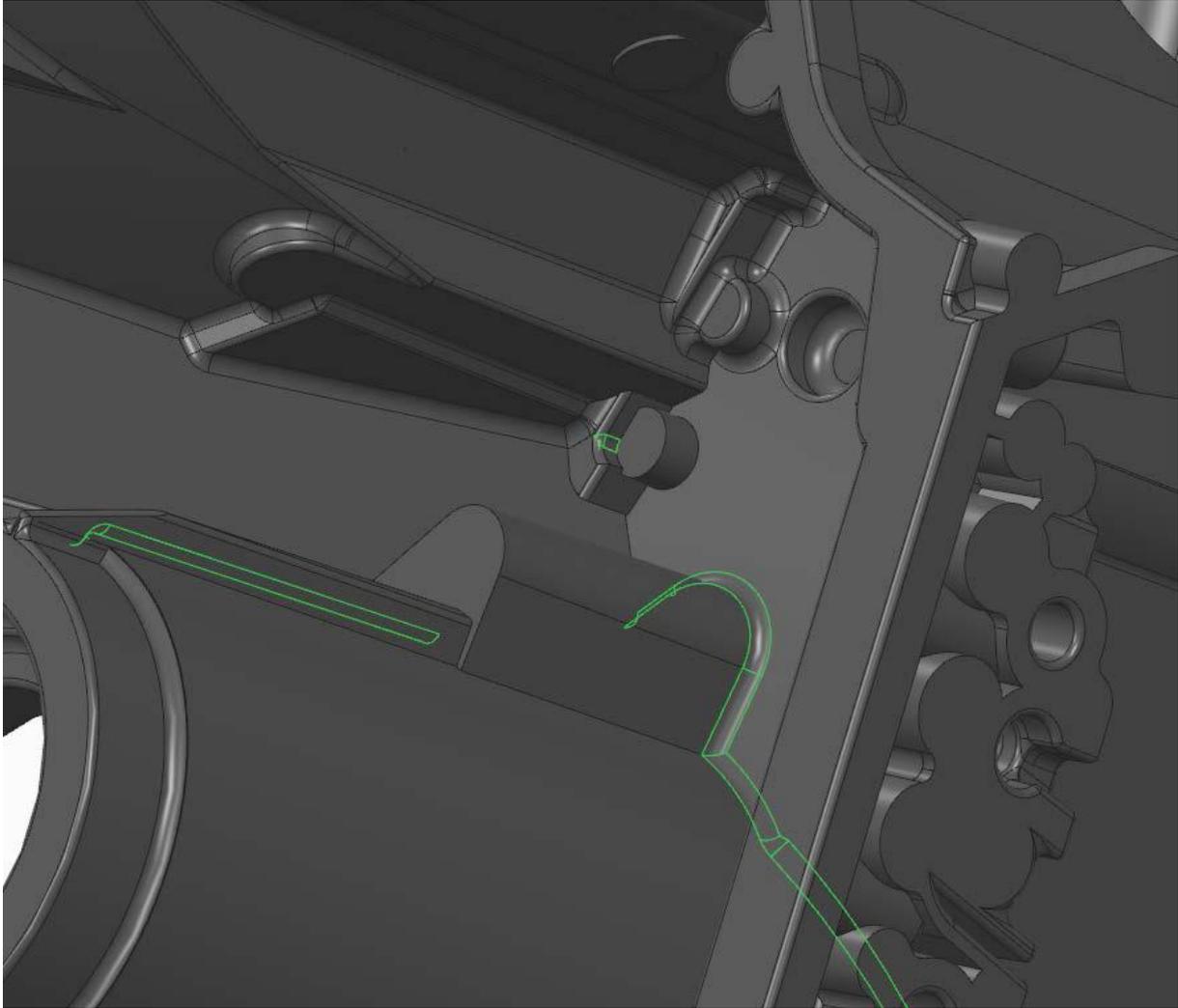
a) The roundings should be generated in the model area by area (in the model tree adjacent roundings should also be geometrically close).



### b) One rounding construction element per tangential edge

A rounding element is defined by a tangential edge as a reference. References that are not geometrically connected should be rounded in a rounding element.

(see figure, Feature ID 467363 from AutoRound test run in Oga\_301\_103\_d has three roundings in different areas, so it should not be).



**Is:** three spatially separated references in a round feature

#### **4. time requirement (performance)**

A rounding run for gearbox housings of this size should be completed after 16 hours.

#### **5. Constancy of the rounding in case of component modifications**

A rounding image that is generated automatically after a component change should have a similar characteristic in unchanged areas as the rounding image that was generated automatically before the change. (unchanged roundings in unchanged areas)

### **3. Example data**

The improved functionality should work for packages whose complexity is comparable to the provided sample packages (Oga\_301\_103\_d-ggh\_roh.prt and Oga\_301\_107\_f-kgh\_4z\_roh.prt).

The predecessors of these packages are already completely rounded and should serve as a solution example. These are the packages Oga\_301\_103\_c-ggeh\_roh.prt and Oga\_301\_107\_e-kgh\_4z\_roh.prt.