Gear Design

Gears are of fundamental importance in a number of mechanical applications, from automotive to siderurgic.

Difficulties in design of gears mainly arise from the non-trivial definition of a single tooth profile. As a matter of fact, most of the gears are designed grounding the shape of the tooth on the involute profile.

The involute of a circle (as a function of the angle *x*, in radiants) is defined by the following analytical relation:

$$ev(x) = \tan(x) - x$$

The hand-drawing of this profile is not straightforward, and a better solution is to import on a commercial CAD software a profile previously generated .

To this aim, I wrote a code which is able to draw an involute profile, togheter with the other important features of a gear (base diameter, external diameter, and so on).

The results I obtained are shown below, and well-demonstrate the power of using "a numerical approach" on Computer Aided Design.

Fig. 1: Generation of an involute profile, shape and main features

Fig. 2: Generation of an involute profile, shape and main features

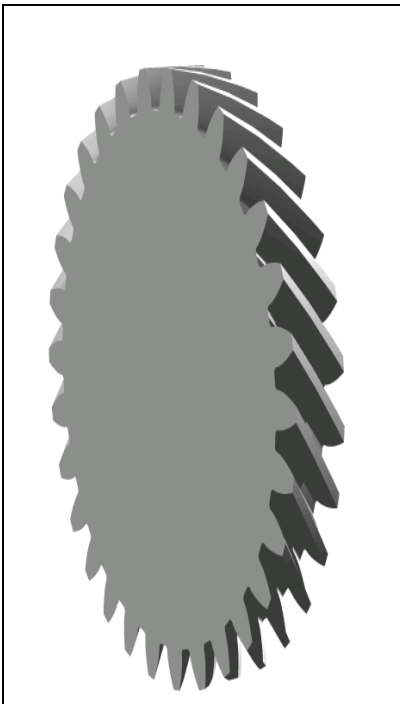The 2-D model can be transferred into a 3-D CAD software, to obtain a three dimensional rendering of the designed gear

Fig. 3: 3D visualization of a gear