

Modelling of Elastic Gearboxes Using a Generalized Gear Contact Model

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In this paper an elastic gear contact model is presented. Using an external planar library [1], it is possible to model arbitrary gear configurations ranging from simple spur gears up to complex epicyclic gear configurations (see Figure 1(a)). In Figure 1(b) the Modelica graphical interface of the epicyclic gear from Figure 1(a) is shown.

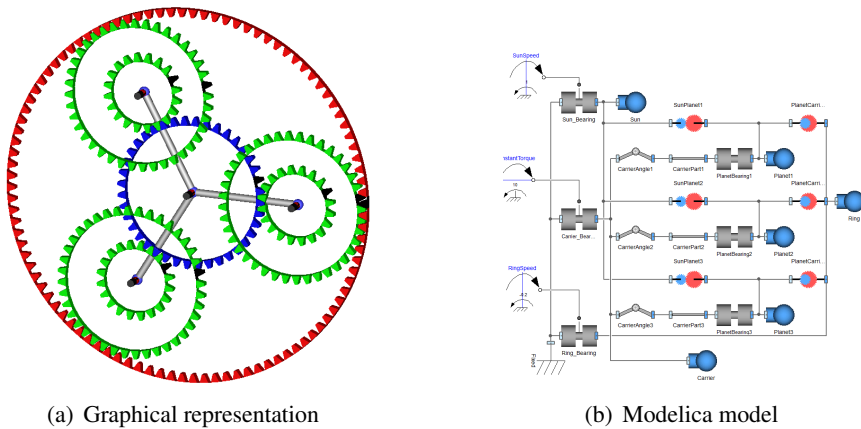


Figure 1: Model of an epicyclic elastic gear

Moreover the presented gear model can simulate a constant- or varying gear tooth elasticity (simulating internal excitations of the gearbox). An example of a simple spur gear with varying tooth stiffness is given (see Figure 2).

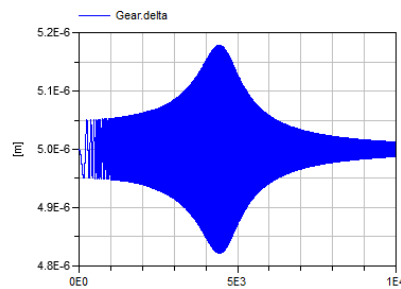


Figure 2: Simulation of the deformation of an elastic spur gear with increasing velocity.

References

- [1] ZIMMER, D. A planar mechanical library for teaching modelica. In *review for the Proceedings of the 9th International Modelica Conference* (2012).