Machinery Gear Tutorial

This tutorial teaches you how to create spur gear pair using the 3D Contact modeling method. The Adams/Machinery Gear module supports multiple combinations of gear type and modeling methodology options.

This chapter includes the following sections:

What You Will Create

During this tutorial, you will model a spur gear pair consisting of two parts with detailed geometry each connected to ground via revolute joints. One gear will be driven by a prescribed motion; the other will be driven by a 3D contact force between the two geometries.

The figure shows the gear pair that you are going to create.

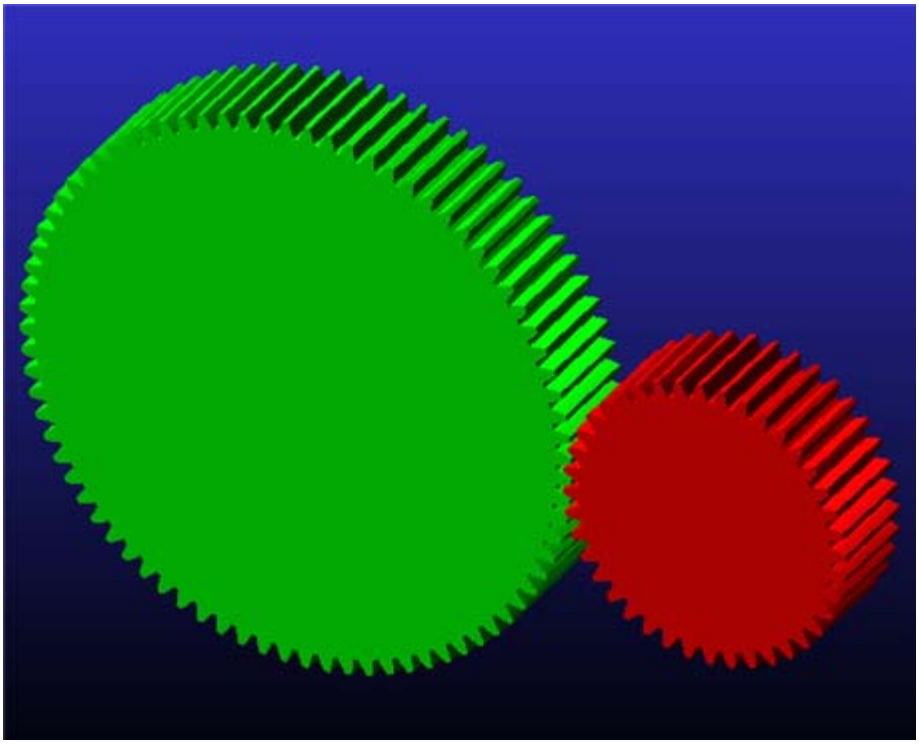


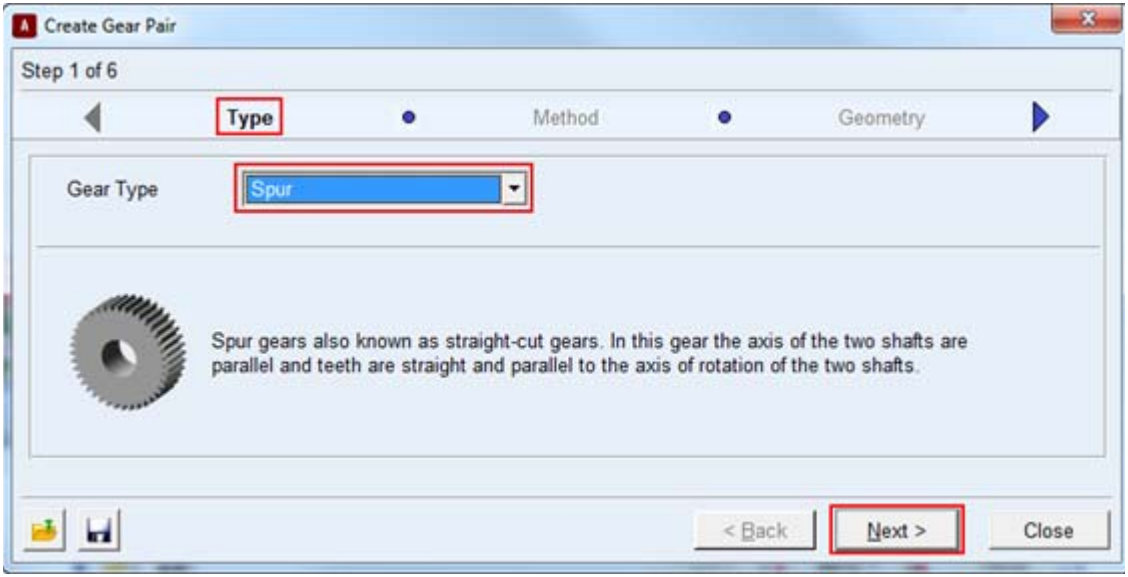
Figure 1 Spur gear pair

Creating Gear Pair

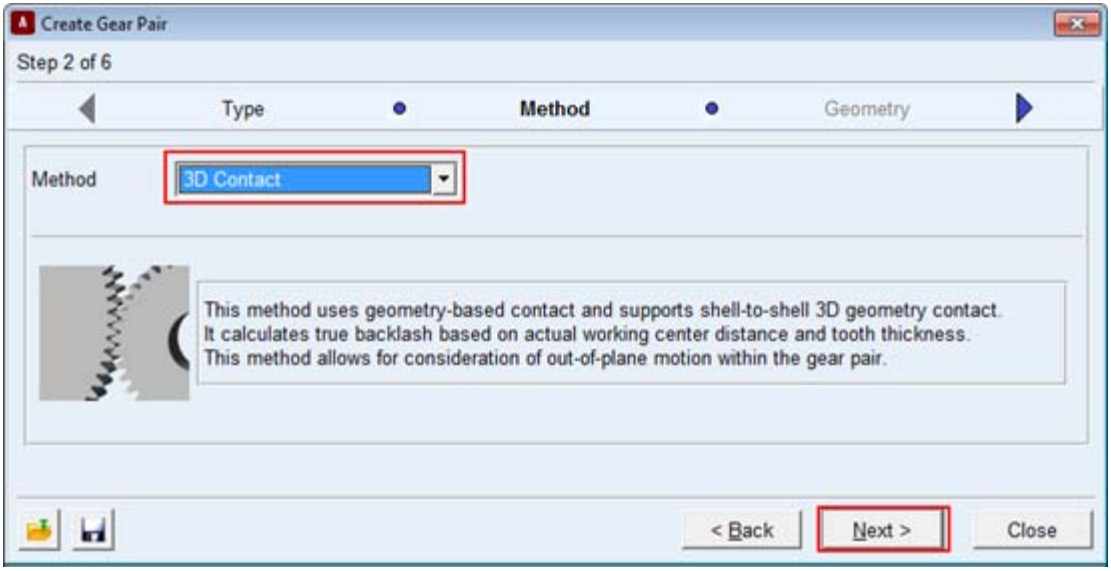
In this section, you will create a gear pair.

1. Click the **Machinery** tab on the Adams/View ribbon.
2. From the **Gear** container, click the icon for **Create Gear Pair.**

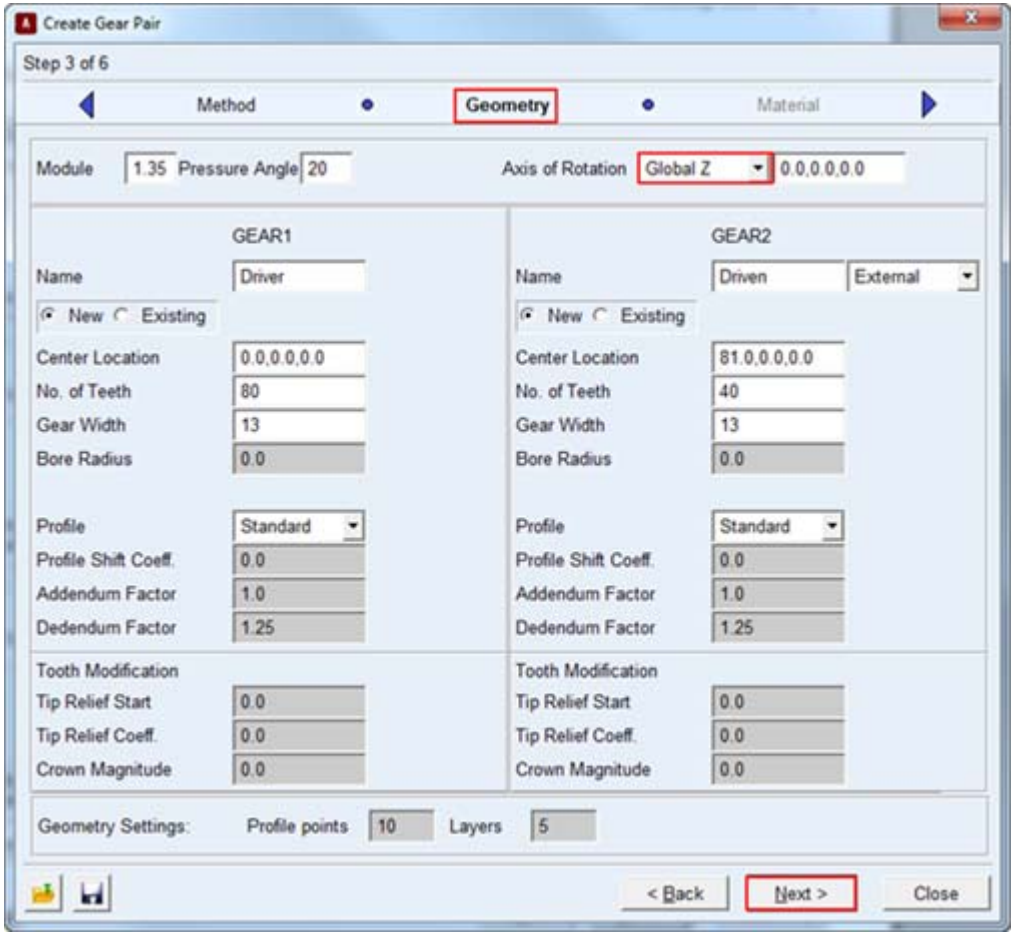
3. The gear pair creation wizard will launch. On the first page (**Type**) select **Spur** from the option menu and click **Next**.



4. On the next page (**Method**) select **3D Contact** from the option menu and click **Next**.



5. Fill out the next page (**Geometry**) by as shown below and Click **Next**.



6. The next page (**Material**) defines the material properties to be used for the mass property calculations for each gear.You can modify the parameters which define the contact force model between the two gears. Accept the defaults and move on by clicking **Next**.

7. On the next page (**Connection**) you define how each gear is to be connected to the rest of the model. For this example, accept the defaults which mount each gear to ground via revolute joints and click **Next**.

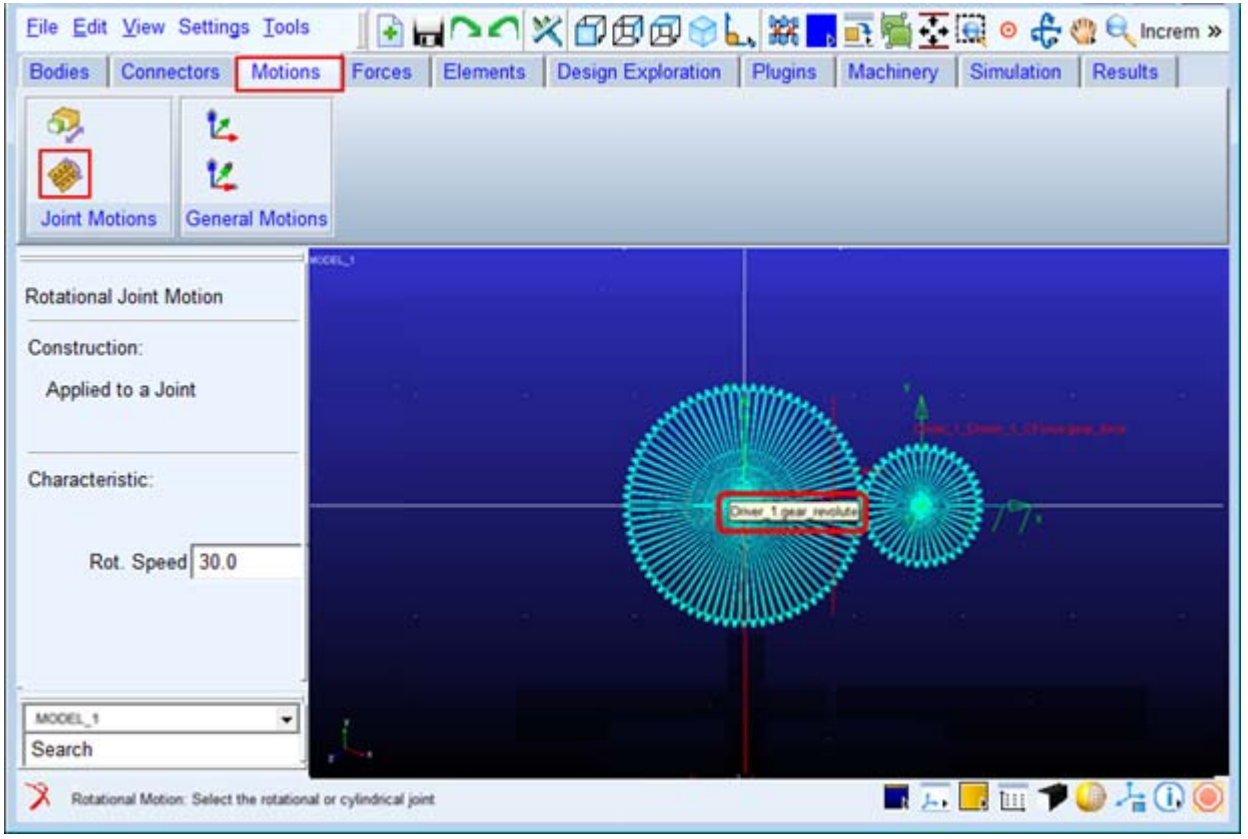
8. On the final page (**Completion**), optionally save the content of the entire wizard to a file for re-use later by clicking the **Save** icon. Click **Finish** to create the gear pair.

Note: It may take a minute or so to create the gear pair geometry.

Adding Motion/Friction

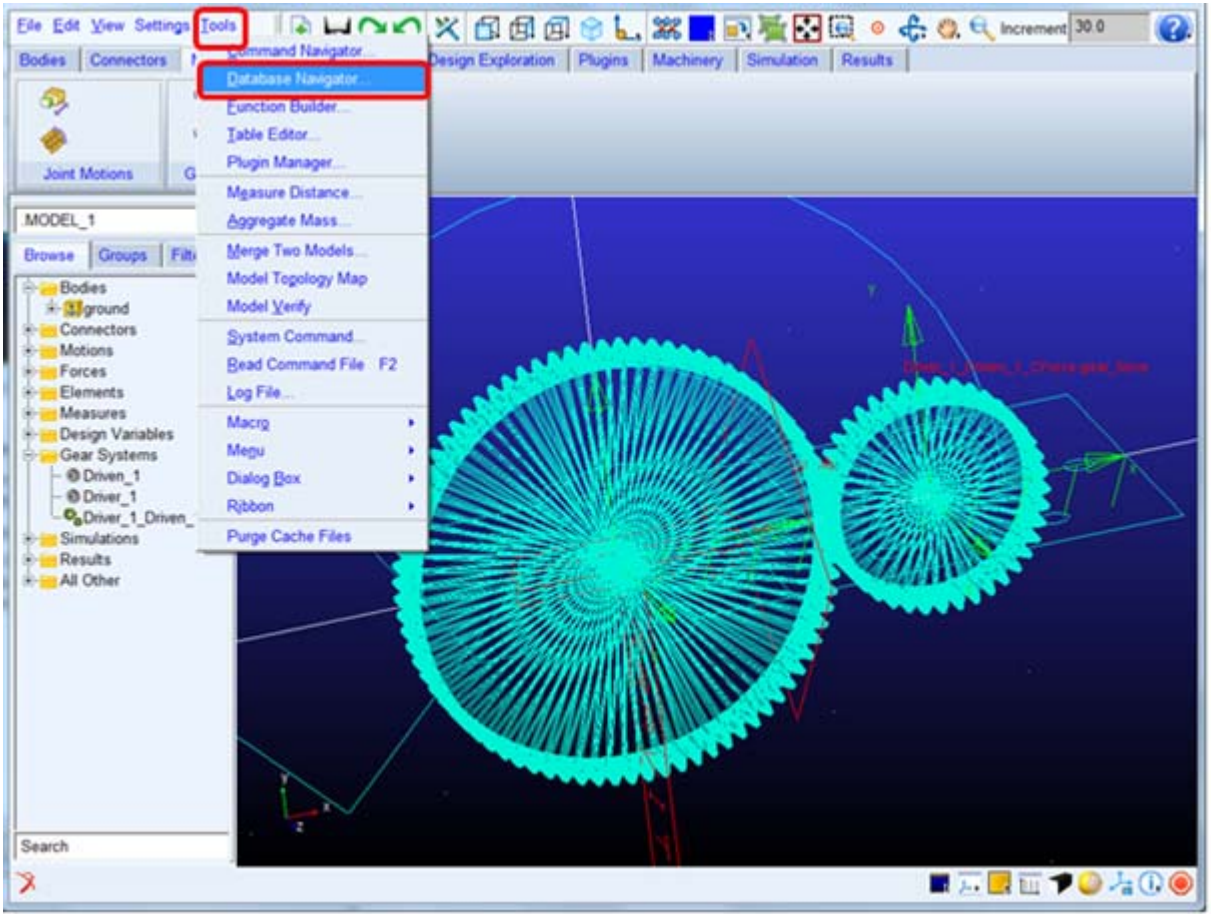
Add a motion to the driver's revolute joint as follows:

1. Select the **Motions** tab from the Ribbon and from the **Joint Motions** container click on the icon for **Rotational Joint Motion**.
2. Then from the graphics window click the revolute joint for the Driver gear (**Driver_1.gear_revolute**).

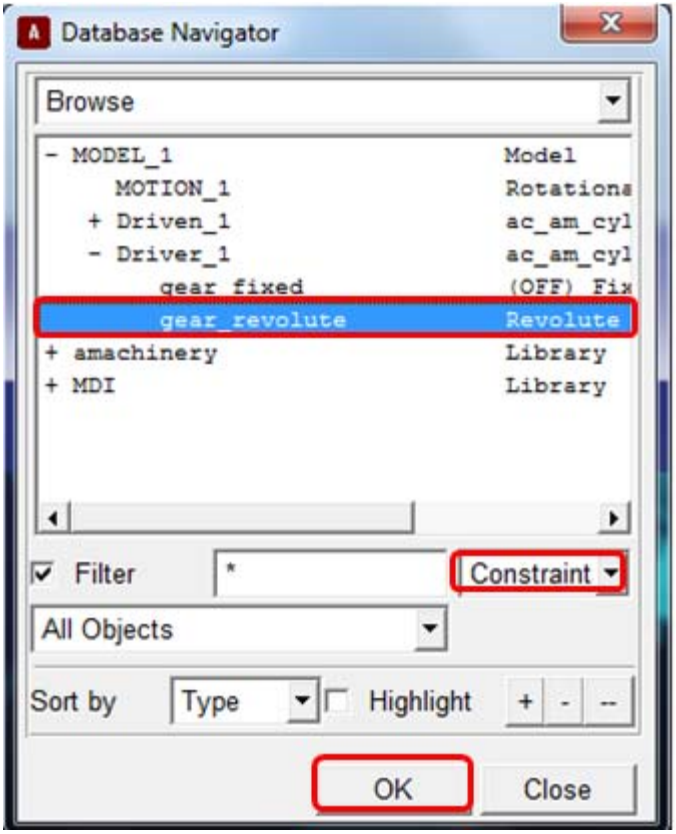


Add friction to the revolute joint for the Driven gear as follows:

1. From the main menu click **Tools** and select **Database Navigator.**

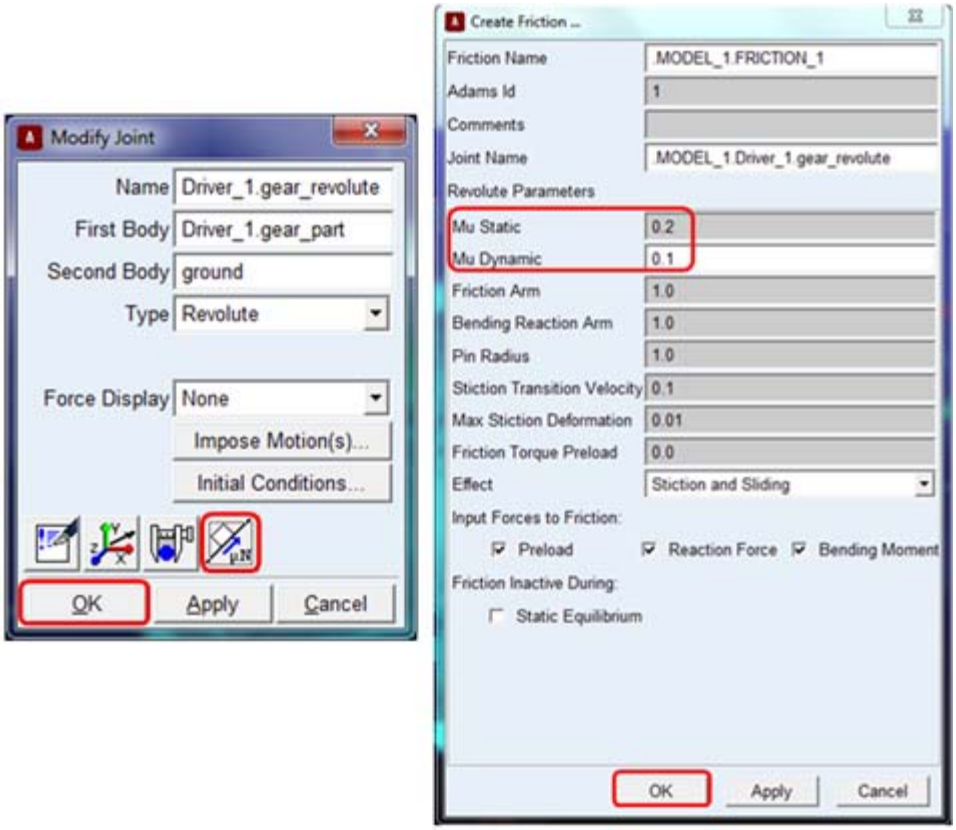


2. From the database navigator select "**Constraint**" for the Filter option and select "gear_revolute" joint and click **OK**.



3. Click **Modify** from the information window as shown below:

4. From the **Create Friction** dialog box, set "Mu Static" = "0.2" and "Mu Dynamic" = "0.1", accept the remaining defaults by clicking **OK** here and then complete by clicking **OK** from the **Modify Joint** dialog box.



Simulation

1. Simulate your model for 6 seconds at 600 steps by clicking the **Interactive Simulation** icon from the **Simulate** container on the **Simulation** tab, entering the values shown below and clicking the **Start Simulation** button (A message window will appear once you click the start button. Please click close.)