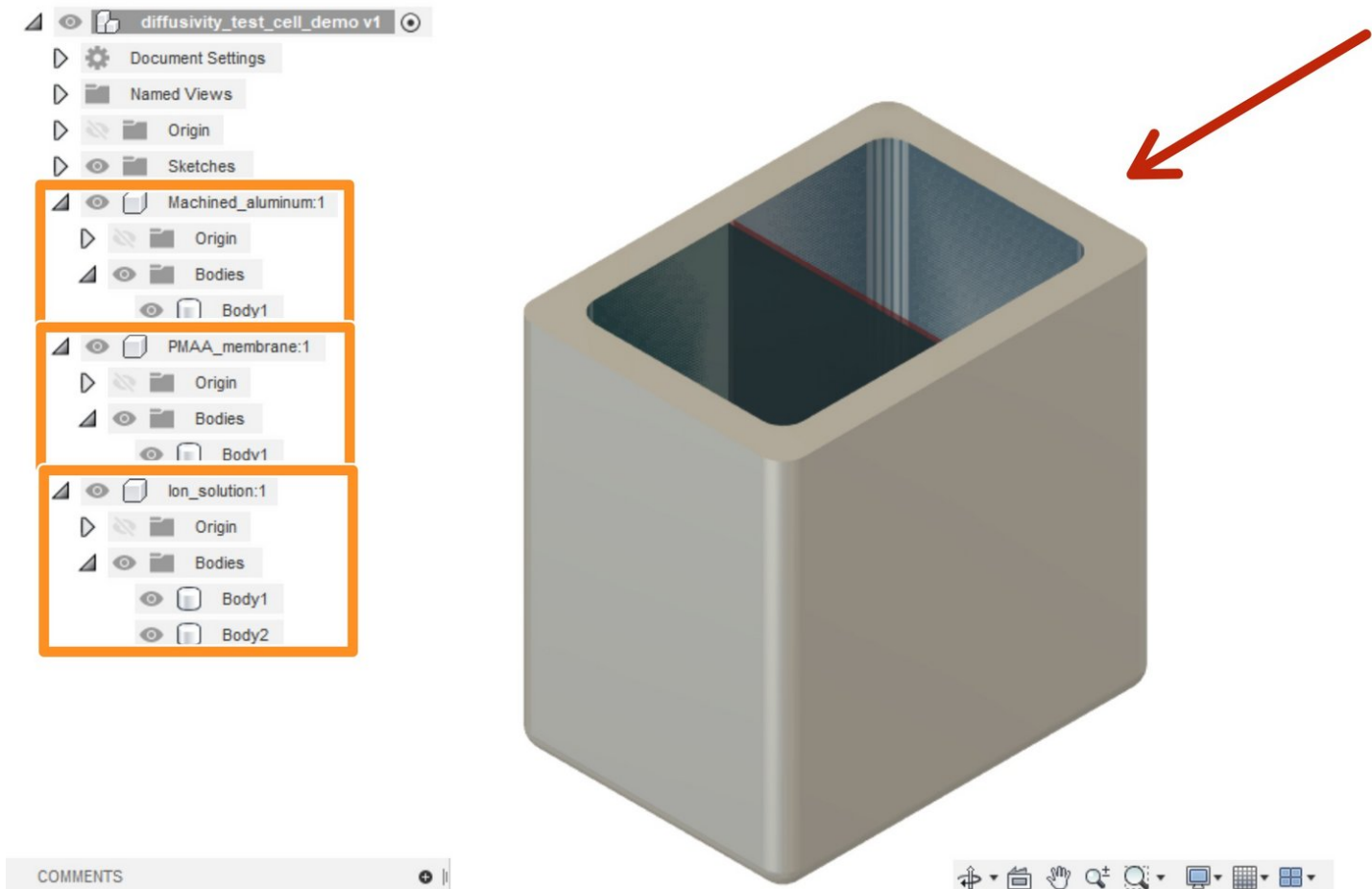




Fundamentals of Parametric Modeling

Parametric modeling enables setting the dimensions of a feature as an editable parameter rather than static number.

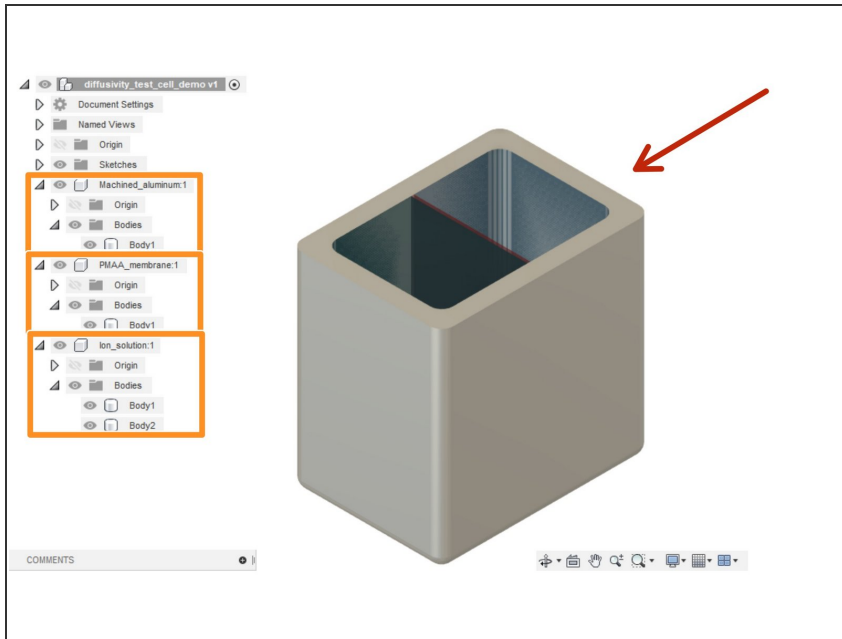
Written By: Eli Jared Fastow



Introduction

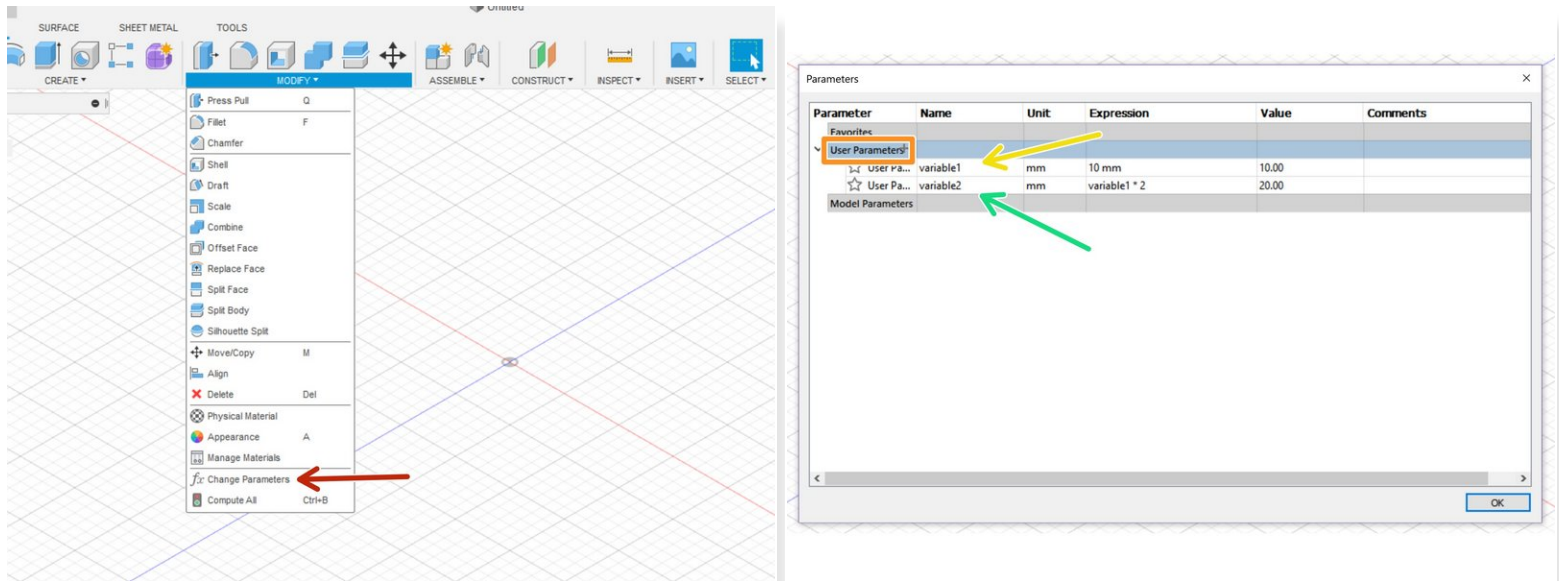
Parametric modeling enables setting the dimensions of a feature as an editable parameter rather than static number. This guide introduces the fundamental skills and applications of parametric modeling.

Step 1 — Review of Components



- Components are groups of sketches and bodies
- Fusion 360 treats components almost like independent parts. When designing multi-part products, creating new sketches and features in an individual component keeps each part independent.
- In the example design, a test cell for a polymer membrane, each component describes a different material
- Each component is boxed in orange. Note that some components contain multiple bodies.

Step 2 — Introduction to Parameters



- Parameters are essentially variables used to define a dimension rather than a static number
- The Modify dropdown menu houses the parameter menu
- Create a new parameter by clicking the + next to the User Parameters box
- Parameters can be definite numbers. In this example, we defined the variable1 parameter as 10 mm.
- Parameters can also be functions that depend on other parameters. In this example we defined the variable2 parameter with the following formula: $\text{variable2} = 2 * \text{variable1}$

Step 3 — Parametric Design Workflow: Component First



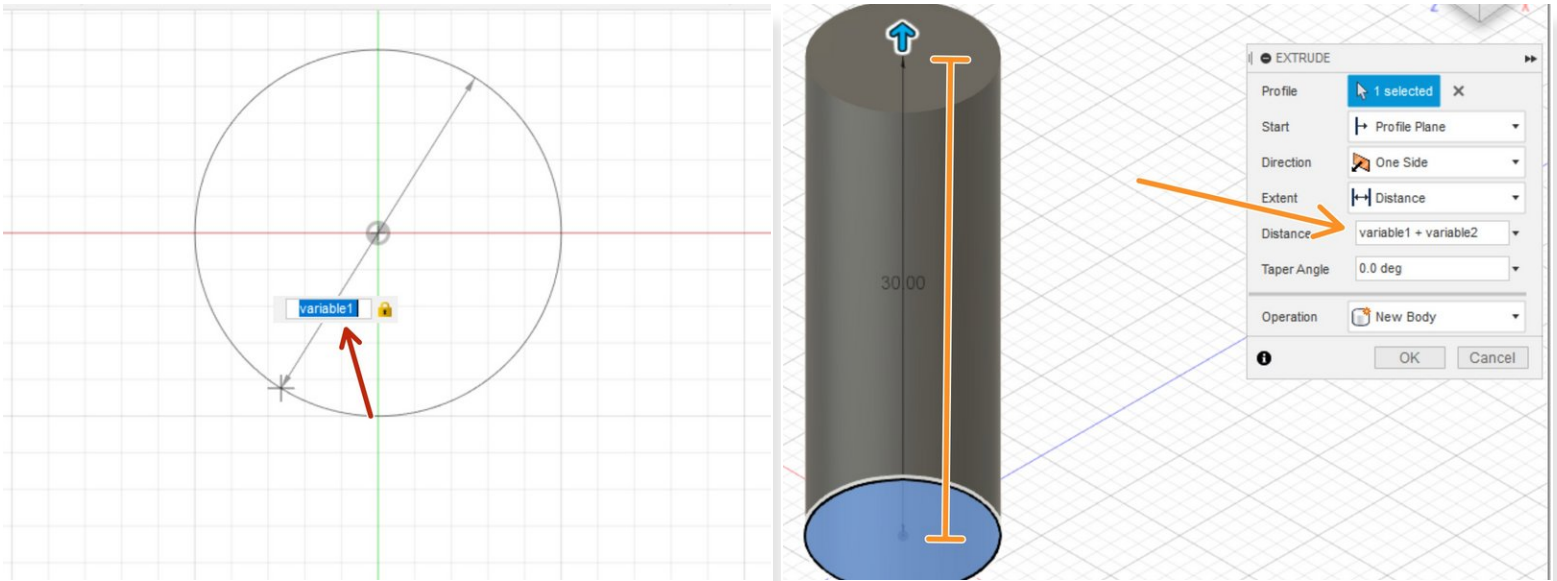
-  Creating multi-component designs with parametric modeling typically follows this workflow
- Create all of the relevant parameters
 - Create all of the components
 - Create a sketch in one active component. Dimension the sketch features with your parameters.
 - Create a body from the sketch with dimensions from the pre-made parameters.
 - Modify the body if necessary
 - Repeat this process until the component is complete. Then repeat that process for each component until they are all complete.
 - Assemble the components. For more detail on component assembly, see [Assemblies](#)

Step 4 — Parametric Design Workflow: Skeletal



- i** Creating multi-component designs with parametric modeling can also follow this workflow if a few sketches form the basis of many components
- Create all parameters
 - Create sketches using parameters
 - Create bodies from sketches using the pre-made parameters
 - Sort those bodies into components
 - Modify the bodies sorted in components

Step 5 — Applying Parameters to a Design



- i** Features dimensioned with parameters will automatically change size if the parameters change
- To dimension a feature with a parameter, simply type in the parameter rather than a static number
 - Parameters can be entered either when creating the feature or with a dimension tool
 - Parameters can be added, subtracted, or multiplied when dimensioning a feature

Step 6 — Parametric Design Best Practices



- Plan parameters and the timeline before starting the design.
- Constrain sketch features in the desired shapes before shifting parameters. Constraints prevent the warping of sketch features when dimensions change.
- Completely constrain the dimensions of your parts with parameters. That way, changing dimensions later merely requires altering a parameter
- Design components and bodies with an exact fit, then add a "tolerance" parameter.
 - The [Tolerancing](#) guide gives a more in-depth look at the process of designing tolerances to set this parameter