

Demo: Calculating Prediction and Tolerance Intervals

In this video, you learn how to construct prediction intervals and tolerance intervals in JMP using the file Diameter 04.jmp. This data set contains diameter measurements for 100 parts, collected in rational subgroups.

First, we create a distribution analysis for Diameter. To do this, we use the Distribution platform from the Analyze menu. We select Diameter for Y, Column and click OK.

A 95% confidence interval is provided, by default, in the Summary Statistics table. This is reported as Upper 95% Mean and Lower 95% Mean. Based on these data, we are 95% confident that the true mean diameter is between 16.13 and 16.15 mm.

To generate a prediction interval, we select the Prediction Interval from the red triangle for Diameter.

In the resulting dialog box, you can specify the confidence level and the number of future samples to include in the interval.

By default, JMP produces a two-sided prediction interval. Options for one-sided intervals are also available.

We'll accept the default values and specify a two-sided 95% prediction interval for the next observation.

The prediction interval is 16.02 to 16.25 mm. Assuming that the process does not change, you can be 95% confident that the diameter for the next part will fall within this interval.

Now, we construct a tolerance interval for these same data. To do this, we select Tolerance Interval from the red triangle for Diameter.

In the dialog box, you can specify the confidence level and the proportion of future values to be covered by the tolerance interval.

By default, JMP produces a two-sided tolerance interval, but you can select a one-sided interval instead. JMP also produces a tolerance interval assuming the normal distribution. If the underlying distribution is not normal, you can select a nonparametric tolerance interval instead.

We'll construct a 95% tolerance interval to cover 95% of future observations, using the other default settings.

From this interval, we can be 95% confident that at least 95% of future diameter values will fall between 16.01 and 16.27.