

Introduction

A process capability analysis compares the distribution of output from an in-control process to its specification limits to determine the consistency with which the specifications can be met. The CAPABILITY procedure provides the following:

- process capability indices, such as C_p and C_{pk}
- descriptive statistics based on moments, including skewness and kurtosis. Other descriptive information provided includes quantiles or percentiles (such as the median), frequency tables, and details on extreme values.
- histograms and comparative histograms. Optionally, these can be superimposed with specification limits, fitted probability density curves for various distributions, and kernel density estimates.
- cumulative distribution function plots (cdf plots). Optionally, these can be superimposed with specification limits and probability distribution curves for various distributions.
- quantile-quantile plots (Q-Q plots), probability plots, and probability-probability plots (P-P plots). These plots facilitate the comparison of a data distribution with various theoretical distributions. Optionally, Q-Q plots and probability plots can be superimposed with specification limits.
- goodness-of-fit tests for a variety of distributions including the normal. The assumption of normality is critical to the interpretation of capability indices.
- statistical intervals (prediction, tolerance, and confidence intervals) for a normal population
- the ability to produce plots either on a line printer or on graphics devices. Plots produced on graphics devices can be saved, replayed, and annotated.
- the ability to inset summary statistics and capability indices in plots produced on a graphics device
- the ability to analyze data sets with a frequency variable
- the ability to read specification limits from a data set
- the ability to create output data sets containing summary statistics, capability indices, histogram intervals, parameters of fitted curves, and statistical intervals

You can use the PROC CAPABILITY statement, together with the VAR and SPEC statements, to compute summary statistics and process capability indices. See “Getting Started” on page 9 for introductory examples. In addition, you can use the statements summarized in the following table to request plots and specialized analyses:

Statement	Result	Getting Started
CDFPLOT	cumulative distribution function plot	page 66
COMPHISTOGRAM	comparative histogram	page 88
HISTOGRAM	histogram	page 118
INSET	inset table on plot	page 192
INTERVALS	statistical intervals	page 218
OUTPUT	output data set with summary statistics and capability indices	page 234
PPPLOT	probability-probability plot	page 252
PROBPLOT	probability plot	page 276
QQPLOT	quantile-quantile plot	page 308

You can use the INSET statement with any of the plot statements to enhance the plot with an inset table of summary statistics. The INSET statement is applicable only to plots produced on graphics devices.

Learning about the CAPABILITY Procedure

To learn about the CAPABILITY procedure, first select the appropriate statement from the preceding table. Then turn to the corresponding “Getting Started” section for introductory examples.

To broaden your knowledge of the procedure, read Chapter 1, “PROC CAPABILITY and General Statements,” which summarizes the syntax for the entire procedure and describes the PROC CAPABILITY statement, the VAR statement, and the SPEC statement. Subsequent chapters describe the statements listed in the preceding table. In addition to introductory examples, each chapter provides syntax summaries, descriptions of options, computational details, and advanced examples. Although the chapters are self-contained, much of what you learn about one plot statement, including the syntax, is transferable to other plot statements.

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