Ponderosa Computing Statistical Distributions Excel Add-ins Release Notes Version 1.4.0

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Features

This add-in implements the following Excel worksheet statistical distribution functions:

Continuous Distributions	Functions
Beta	SD.BETA.PDF(), SD.BETA.LTP(), SD.BETA.UTP(), SD.BETA.LTQ(), SD.BETA.UTQ()
Standard Beta	SD.SBETA.PDF(), SD.SBETA.LTP(), SD.SBETA.UTP(), SD.SBETA.LTQ(), SD.SBETA.UTQ()
Cauchy	SD. CAUCHY.PDF(), SD. CAUCHY.LTP(),SD.CAUCHY.UTP(), SD. CAUCHY.LTQ(), SD. CAUCHY.UTQ()
Chi-Squared	SD.CHISQ.PDF(), SD.CHISQ.LTP(), SD.CHISQ.UTP(), SD.CHISQ.LTQ(), SD.CHISQ.UTQ()
Exponential	SD.EXPON.PDF(), SD.EXPON.LTP(), SD.EXPON.UTP(), SD.EXPON.LTQ(), SD.EXPON.UTQ()

Maximum Extreme Value	SD. EVMAX.PDF(), SD. EVMAX.LTP(), SD. EVMAX.UTP(), SD. EVMAX.LTQ(), SD. EVMAX.UTQ()
Minimum Extreme Value	SD. EVMIN.PDF(), SD. EVMIN.LTP(), SD. EVMIN.UTP(), SD. EVMIN.LTQ(), SD. EVMIN.UTQ()
Gamma	SD.GAMMA.PDF(), SD.GAMMA.LTP(), SD.GAMMA.UTP(), SD.GAMMA.LTQ(), SD.GAMMA.UTQ()
Logistic	SD.LOGISTIC.PDF(), SD.LOGISTIC.LTP(), SD.LOGISTIC.UTP(), SD.LOGISTIC.LTQ(), SD.LOGISTIC.UTQ()
Lognormal	SD.LNORM.PDF(), SD.LNORM.LTP(), SD.LNORM.UTP(), SD.LNORM.LTQ(), SD.LNORM.UTQ()
Normal	SD.NORM.PDF(), SD.NORM.LTP(), SD.NORM.UTP(), SD.NORM.LTQ(), SD.NORM.UTQ()
Standard Normal	SD.SNORM.PDF(), SD.SNORM.LTP(), SD.SNORM.UTP(), SD.SNORM.LTQ(), SD.SNORM.UTQ()
Snedecor F	SD.F.PDF(), SD.F.LTP(), SD.F.UTP(), SD.F.LTQ(), SD.F.UTQ()
Student's t	SD.T.PDF(), SD.T.LTP(), SD.T.UTP(), SD.T.LTQ(), SD.T.UTQ()
Weibull	SD.WEIBULL.PDF(), SD.WEIBULL.LTP(), SD.WEIBULL.UTP(), SD.WEIBULL.LTQ(), SD.WEIBULL.UTQ()
Discrete Distributions	**Functions**
Binomial	SD.BINOM.PMF(), SD.BINOM.LTP(), SD.BINOM.UTP(), SD.BINOM.LTQ(), SD.BINOM.UTQ()
Geometric	SD.GEOM.PMF(), SD.GEOM.LTP(), SD.GEOM.UTP(), SD.GEOM.LTQ(), SD.GEOM.UTQ()
Hypergeometric	SD.HGEOM.PMF(), SD.HGEOM.LTP(), SD.HGEOM.UTP(), SD.HGEOM.LTQ(), SD.HGEOM.UTQ()
Negative Binomial	SD.NBINOM.PMF(), SD.NBINOM.LTP(), SD.NBINOM.UTP(), SD.NBINOM.LTQ(), SD.NBINOM.UTQ()
Poisson	SD.POISSON.PMF(), SD.POISSON.LTP(), SD.POISSON.UTP(), SD.POISSON.LTQ(), SD.POISSON.UTQ()

Each distribution has either a probability mass function (PMF) or probability density function (PDF), depending on whether the distribution is discrete or continuous, respectively. Each distribution also has explicit lower tail probability (LTP), upper tail probability (UTP), lower tail quantile (LTQ), and upper tail quantile (UTQ) functions.

Requirements

There are two Add-ins, PcStaDistXLL_32.xll and PcStaDistXLL_64.xll.

- Both require Microsoft Windows 7, 8, or 10.
- PcStaDistXLL_32.xll requires 32-bit Excel 2007 or later.
- PcStaDistXLL_64.xll requires 64-bit Excel 2010 or later.

Implementation

The Ponderosa Computing Statistical Distributions Excel Add-in uses the **Boost C++ Math Toolkit version 2.9.0**, part of the Boost C++ Libraries version 1.70.0 provided by Boost.org, as the computational engine of its statistical distributions functions, distributed under the Boost Software License.

Known Issues

1. The Boost Math Toolkit documentation states that its implementation of the **hypergeometric** distribution functions loose significant precision for large population sizes. For a population size N one should expect to lose $\log_{10} N$ decimal digits of precision, with the results becoming meaningless for $N \geq 10^{15}$. Due to the computational complexity and loss of precision for large population sizes in the hypergeometric distribution function implementation, the parameters for the hypergeometric worksheet functions are restricted to the range of C++ unsigned integers [0, 4294967295].

Changes from Previous Versions

From Release 1.3.0:

1. Both 32-bit Excel PcStaDistXLL_32.xll and 64-bit Excel PcStaDistXLL_64.xll installation packages are provided.
2. The add-in was built using the Visual Studio 2019 Platform Toolset v142. The corresponding Visual C++ Redistributable will be installed if necessary.

From Release 1.2.0:

3. The add-in was built using Visual Studio 2017 Platform Toolset v141. The corresponding Visual C++ Redistributable will be installed if necessary.

From Release 1.1.2:

The add-in was built on Boost version 1.70 (Math Toolkit 2.9.0). Changes from Boost 1.57.0 (Math Toolkit 2.1.0) include:

1. Fixed some corner cases in the beta, incomplete beta, and incomplete beta derivative. This impacts:
   a. SD.BINOM.PMF(),
   b. SD.NBINOM.PMF(),
   c. SD.T.PDF(),
   d. SD.T.LTP(),
   e. SD.T.UTP(),
   f. SD.T.LTQ(), and
   g. SD.T.UTQ().
2. Improved the accuracy of the erfc function's rational approximations. This impacts:
   a. SD.NORM.LTQ(),
   b. SD.NORM.UTQ(),
   c. SD.SNORM.LTQ(), and
   d. SD.SNORM.UTQ().
3. Fixed extreme-value pdf for large valued inputs. This impacts:
   a. SD. EVMAX.PDF() and
   b. SD. EVMIN.PDF(),

From Release 1.1.1:

1. A conflict between menu commands across multiple add-ins has been corrected.

From Release 1.1.0:

1. The install package can be installed over the current version.
2. Custom installation dialog images were added.
3. The Excel add-in Registration Dialog has been removed and the About Dialog has been simplified.