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Enhancement Details: Mathcad Prime 2.0

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Enhancement Details

Mathcad Prime 2.0

3D Plots
You can plot surfaces, curves, and data points on three-dimensional plots.

Clear Multiple Variables Numerically or Symbolically
Clear(x,y,z) and clearsym(x,y,z) clears multiple variable definitions both symbolically and numerically or symbolically only.

Collapsible Areas
Areas can be inserted into a worksheet and collapsed to hide complicated equations.

Excel Component
An Excel component allows you to embed Excel's tabular format within a Mathcad worksheet.

Input Matrices Can Be Resized
You can resize both input matrices and result matrices. Resized matrices improve conversion of data tables and input tables from earlier versions of Mathcad.

Is Element Of Operator
The Is Element Of comparison operator indicates if an element is a member of complex, real, or integer numbers.

KNITRO Solvers
The optimization solvers in Mathcad Prime 2.0 are from the advanced KNITRO 7.0 optimization software library.

Leveraging 64-bit Computers
Mathcad Prime 2.0 is available in both a 32-bit and a 64-bit version.

Multithreading
Multithreading allows multiple processes to calculate at the same time to speed up processing large data sets and matrices.

New Symbolic Operators: Limits and Indefinite Integral
The symbolic operators: indefinite integral and right-hand, left-hand, and two-sided limits are added.

Resizing of Large Symbolic Results
Large symbolic results appear truncated and can be resized.

Symbolic Explicit Functionality
The explicit keyword allows you to return expressions with the values of variables substituted in place but without reducing numerical expressions.

Symbolic Math
You can calculate expressions with variables and symbols and obtain results in symbolic form.

Enhancement Details

3D Plots

You can plot surfaces, curves, and data points on three-dimensional plots.

Product Information

Product	Mathcad Prime
PTC Support Release	2.0
Product Functional Area	Mathcad
User Interface Location	On the Plots tab, in the Traces group, open the Insert Plot list and then select 3D Plot.
Processes, Initiatives, and Best Practices	

Benefits and Description

Use three-dimensional plots to visualize a function of two variables, a vector-valued function, or a 3D data set. You can plot surfaces, whose nodes are connected into a mesh, curves in 3D space, and scattered data points. An axis selection widget enables you to edit the range on specific axes. Spin, Pan, and Zoom buttons are conveniently attached to each plot.

Enhancement Details

Clear Multiple Variables Numerically or Symbolically

Clear(x,y,z) and clearsym(x,y,z) clears multiple variable definitions both symbolically and numerically or symbolically only.

Product Information

Product	Mathcad Prime
PTC Support Release	2.0
Product Functional Area	Mathcad
User Interface Location	In the Functions tab click All Functions, then click on clear in the Special category. Add a literal subscript for the clearsym function.
Processes, Initiatives, and Best Practices	

Benefits and Description

The clear function clears the value of multiple variables so the variables can be reused without carrying over assigned definitions. The $clear_{sym}$ function only clears the symbolic values of variables, while retaining the variables numeric values.

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Collapsible Areas

Areas can be inserted into a worksheet and collapsed to hide complicated equations.

Product Information

Product	Mathcad Prime
PTC Support Release	2.0
Product Functional Area	Mathcad
User Interface Location	On the Document tab, in the Regions group, click the Area icon. Collapse and expand areas directly on the area.
Processes, Initiatives, and Best Practices	

Benefits and Description

Areas are collapsible sections of the worksheet that allow you to group and hide calculations and other content. Inside an area you can define variables, perform calculations, and program functions. You can insert as many collapsible areas as desired in a single Mathcad worksheet.

Use areas to structure your worksheets by grouping regions in a section that can be repositioned as a group. Hide complicated math, programs, and definitions from presentations and shared documents depending on your audience. An area of definitions can be copied from worksheet to worksheet.

Enhancement Details

Excel Component

An Excel component allows you to embed Excel's tabular format within a Mathcad worksheet.

Product Information

Product	Mathcad Prime
PTC Support Release	2.0
Product Functional Area	Mathcad
User Interface Location	On the Input/Output tab, in the Data Import/Export group, open the Excel Component list and insert the Excel Component.
Processes, Initiatives, and Best Practices	

Benefits and Description

An Excel component is an embedded Excel table inserted within a Mathcad worksheet. You can leverage Excel's tabular presentation within Mathcad. You can edit and format your data using all Excel tools, directly within the Mathcad worksheet.

You can embed an Excel spreadsheet, send values to the Excel spreadsheet, and extract values from it. Thus Excel calculation can be part of the calculation flow of the Mathcad worksheet.

Enhancement Details

Input Matrices Can Be Resized

You can resize both input matrices and result matrices. Resized matrices improve conversion of data tables and input tables from earlier versions of Mathcad.

Product Information

Product	Mathcad Prime
PTC Support Release	2.0
Product Functional Area	Mathcad
User Interface Location	Select the bottom edge or right side of a matrix to resize it.
Processes, Initiatives, and Best Practices	

Benefits and Description

You can resize large input and output matrices to a smaller size, to conserve space and legibility on a worksheet page.

Converted data tables and input tables from earlier versions of Mathcad appear as input matrices. They now convert in a smaller size that matches their original size in the previous worksheet.

Enhancement Details

Is Element Of Operator

The Is Element Of comparison operator indicates if an element is a member of complex, real, or integer numbers.

Product Information

Product	Mathcad Prime
PTC Support Release	2.0
Product Functional Area	Mathcad
User Interface Location	On the Math tab, in the Operators and Symbols group, open the Operators list and insert the Is Element Of operator from the Comparison group.
Processes, Initiatives, and Best Practices	

Benefits and Description

The Is Element Of operator allows you to determine if an element is included in the complex, real, or integer set. The sets are indicated by double-struck C, R, and Z, which are in the math symbols list in the ribbon. The result is a 1 if the element is a member of the set, and a 0 if it is not.

Enhancement Details

KNITRO Solvers

The optimization solvers in Mathcad Prime 2.0 are from the advanced KNITRO 7.0 optimization software library.

Product Information

Product	Mathcad Prime
PTC Support Release	2.0
Product Functional Area	Mathcad
User Interface Location	The KNITRO solvers are in the solve block functions minimize and maximize.
Processes, Initiatives, and Best Practices	

Benefits and Description

The optimization solvers in Mathcad Prime 2.0 run by the advanced KNITRO 7.0 optimization software library. The KNITRO library offers improved performance and robustness over the old solver by providing two algorithms: Interior-Point (Barrier method) and the Active-Set method.

- Functions **find** and **minerr** for unconstrained optimization or systems of coupled equations (linear or non-linear) continue to use the existing LM (Levenberg-Marquardt) algorithm by default. If LM fails, the problem is recast as an optimization problem and Mathcad resolves it using the KNITRO engine.
- Functions **minimize** and **maximize** for constrained optimization now rely on the KNITRO solver. The solver is set up to attempt multiple algorithms automatically and fails only if the problem has no reasonable solution.

Enhancement Details

Leveraging 64-bit Computers

Mathcad Prime 2.0 is available in both a 32-bit and a 64-bit version.

Product Information

Product	Mathcad Prime
PTC Support Release	2.0
Product Functional Area	Mathcad
User Interface Location	Install the 64-bit version of Mathcad Prime 2.0.
Processes, Initiatives, and Best Practices	

Benefits and Description

The 64-bit version of Mathcad Prime 2.0 leverages the processing power of 64-bit computers. It runs as native 64-bit application.

Enhancement Details

Multithreading

Multithreading allows multiple processes to calculate at the same time to speed up processing large data sets and matrices.

Product Information

Product	Mathcad Prime
PTC Support Release	2.0
Product Functional Area	Mathcad
User Interface Location	On the Calculation tab, in the Worksheet Settings group, open the Calculation Options list and click Multithreading.
Processes, Initiatives, and Best Practices	

Benefits and Description

Multithreading is off by default. Turning on multithreading allows multiple calculations to run in parallel. Multithreading speeds up the processing of large data sets and large matrices.

Enhancement Details

New Symbolic Operators: Limits and Indefinite Integral

The symbolic operators: indefinite integral and right-hand, left-hand, and two-sided limits are added.

Product Information

Product	Mathcad Prime
PTC Support Release	2.0
Product Functional Area	Mathcad
User Interface Location	On the Math tab, in the Operators and Symbols group, open the Operators list and insert integral or limits.
Processes, Initiatives, and Best Practices	

Benefits and Description

You can insert the integral operator and fill in the placeholders to make either a definite or indefinite integral. Indefinite integrals can only be evaluated symbolically.

You can insert one limits operator, and fill in placeholders to make either a right-hand, left-hand or two-sided limit. You can evaluate the limits of a symbolic expression.

Enhancement Details

Resizing of Large Symbolic Results

Large symbolic results appear truncated and can be resized.

Product Information

Product	Mathcad Prime
PTC Support Release	2.0
Product Functional Area	Mathcad
User Interface Location	You can resize a large symbolic result by dragging the resize bar on the right side of the region.
Processes, Initiatives, and Best Practices	

Benefits and Description

Large symbolic results can extend for more than one page width to the right of an expression. The results are displayed truncated with ellipses to indicate that the full result is not displayed. You can drag the resize bar on the right side of a region to view the entire result or reset the width of the result.

Enhancement Details

Symbolic Explicit Functionality

The explicit keyword allows you to return expressions with the values of variables substituted in place but without reducing numerical expressions.

Product Information

Product	Mathcad Prime
PTC Support Release	2.0
Product Functional Area	Mathcad
User Interface Location	On the Math tab, in the Operators and Symbols group, open the Symbolics list and insert the symobolic operator and the explicit keyword or type it in directly.
Processes, Initiatives, and Best Practices	

Benefits and Description

Use the explicit keyword in a symbolic expression to:

- Return expressions with the values of variables but without reducing numerical expressions.
- Specify which variables to display as variables in a symbolic result and which variables to display numerically.
- Show intermediate steps of a symbolic evaluation.
- Temporarily ignore the value of a variable.

Enhancement Details

Symbolic Math

You can calculate expressions with variables and symbols and obtain results in symbolic form.

Product Information

Product	Mathcad Prime
PTC Support Release	2.0
Product Functional Area	Mathcad
User Interface Location	On the Math tab, in the Operators and Symbols group, open the Symbolics list and insert the symbolic operator and keywords.
Processes, Initiatives, and Best Practices	

Benefits and Description

- Unlike numerical evaluation, with symbolic (algebraic) math you can evaluate expressions without assigning values to variables.
- Symbolic results can reveal relationships among variables that might not be apparent from numerical results.
- Symbolic calculations are immune to the round-off errors that are inherent in numerical calculations.