



PTC MATHCAD ROADMAP

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June 2016

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WHAT IS PTC MATHCAD?

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A digital engineering notebook to perform your engineering **calculations** and manage your **design intent**

The image shows a horizontal sequence of four circular icons on a blue background, each representing a step in the engineering workflow. The icons are: 1. A circular icon containing a blue waveform graph, representing analysis. 2. A circular icon containing the mathematical formula $T = 2\pi\sqrt{\frac{L}{g}} = 0.634 \text{ s}$, representing solving. 3. A circular icon containing a diagram of a simple pendulum with labels for length (L), gravity (g), and mass (m), along with the same formula, representing documentation. 4. A circular icon containing a document icon and two human silhouettes, representing sharing.

- Analyze •
- Solve •
- Document •
- Share •

PTC Mathcad combines the ease and familiarity of an **engineering notebook** with a powerful **mathematical engine**

WHAT IS PTC MATHCAD?



- Standard mathematical notation
 - Don't need to know Mathcad to understand Mathcad documents
- Comprehensive support for units
 - Explicit units reduce unit assumption errors across cultural boundaries, and prevents disparate unit calculation mistakes
- Document-oriented approach
 - Mathcad worksheet calculates results and communicates ideas at the same time
- Visual presentation features
 - Use of integrated text, images, plots, and areas help annotate the calculations

PTC[×] Mathcad[×] Solving Systems of Equations

Example of Differential Equations: Damped Vibrations

Given:

Mass: $m_1 := 10 \text{ kg}$ $m_2 := 5 \text{ kg}$

Force: $F_1(t) := 5 e^{-0.5 t} \text{ N}$ $F_2(t) := 0 \text{ N}$

Spring constants: $k_1 := 100 \frac{\text{N}}{\text{m}}$ $k_2 := 75 \frac{\text{N}}{\text{m}}$ $k_3 := 100 \frac{\text{N}}{\text{m}}$

Damping coefficients: $c_1 := 5 \frac{\text{N}\cdot\text{s}}{\text{m}}$ $c_2 := 25 \frac{\text{N}\cdot\text{s}}{\text{m}}$ $c_3 := 25 \frac{\text{N}\cdot\text{s}}{\text{m}}$

Guest Values

No Guess Values are necessary for solving ODEs. We only need the Constraints and the Solver.

Constraints

$$m_1 \cdot d_1''(t) = -c_1 \cdot d_1'(t) + c_2 \cdot (d_2'(t) - d_1'(t)) - k_1 \cdot d_1(t) + k_2 \cdot (d_2(t) - d_1(t)) + F_1(t)$$

$$m_2 \cdot d_2''(t) = -c_3 \cdot d_2'(t) + c_2 \cdot (d_1'(t) - d_2'(t)) - k_3 \cdot d_2(t) + k_2 \cdot (d_1(t) - d_2(t)) + F_2(t)$$

$d_1(0 \text{ s}) = 0 \text{ mm}$ $d_1'(0 \text{ s}) = 1 \frac{\text{m}}{\text{s}}$

$d_2(0 \text{ s}) = 0 \text{ mm}$ $d_2'(0 \text{ s}) = -1.5 \frac{\text{m}}{\text{s}}$

Solver

$$\begin{bmatrix} d_1 \\ d_2 \end{bmatrix} := \text{odesolve} \left(\begin{bmatrix} d_1(t) \\ d_2(t) \end{bmatrix}, 7 \text{ s} \right)$$

$t := 0 \text{ s}, 0.01 \text{ s}.. 7 \text{ s}$

System Response: Position vs. Time

$\frac{d_1(t) \text{ (cm)}}{d_2(t) \text{ (cm)}}$

$t \text{ (s)}$

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WHAT IS PTC MATHCAD?

This is PTC Mathcad

Analysis of Axial Flow Machines

Create a cambered airfoil using two 2-D Bezier curves, each defined by the four vectors, B and T. (See Rogers & Adams, "Mathematical Elements for Computer Graphics", McGraw-Hill, 1990, p.293). Define the two polygons so that the 2D airfoil can be defined in a CVT manner starting from the trailing edge. See also program V-10 in this Fluids course and program VII mod in Applied Graphics and Geometry, Vol 1.

$\alpha := \frac{9 \cdot \pi}{150}$ Angle of attack

$n := 8$ $i := 0, 1, \dots, 8$ $G_i := \frac{n!}{i! \cdot (n-i)!}$ Build the blending matrix. The polygons B and T must be defined to satisfy thin airfoil theory.

$B := \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ $T := \begin{bmatrix} 0.7 \\ -0.2 \\ -0.6 \end{bmatrix}$

The parameter t goes from 0 to 1 for all Bezier curves, giving 21 points on the curve.

$j := 0, 1, \dots, 20$ $t_j := \frac{j}{20}$

$J_{i,j} := G_i \cdot (t_j)^i \cdot (1-t_j)^{n-i}$

$XL_j := \sum_i (Bx_i \cdot J_{i,j})$ $YL_j := \sum_i (By_i \cdot J_{i,j})$ $XU_j := \sum_i (Tx_i \cdot J_{i,j})$ $YU_j := \sum_i (Ty_i \cdot J_{i,j})$

$NFL_{i,j} := XL_{i,j}$ $YFL_{i,j} := YL_{i,j} \cdot \cos(\beta(rh - 0.03 \cdot j)) - ZL_{i,j} \cdot \sin(\beta(rh + 0.03 \cdot j))$

$XFU_{i,j} := XU_{i,j}$ $ZFL_{i,j} := YL_{i,j} \cdot \sin(\beta(rh + 0.03 \cdot j)) + ZL_{i,j} \cdot \cos(\beta(rh - 0.03 \cdot j))$

```
// Load an image
src = imread("lena.jpg", CV_LOAD_IMAGE_GRAYSCALE);
dst = src.clone();
if( !src.data )
{ return -1; }

for(int y = 0; y < src.rows; y++)
for(int x = 0; x < src.cols; x++)
dst.at<uchar>(y,x) = 0.0;

pm = phaseStart;

% convert am and pm to i and q and scal
q = am .* sin( pm );
i = am .* cos( pm );
iqwave = [i + (j * q)];

onTime = [zeros(1,(offPts/2)) iqwave(1:(onP
marker = [ones(2,(onPts+edgePts+edgePts)) z
iqwave_size = size (onTime)

=($B$1*$D$1/2)*((PI)*$F$1*$D$1-$H$1)(PI)*$D$1+$F$1*$H$1)+$B$1*$F$2*$D$2/2
```

These are NOT

“Talented engineers are using Excel and getting serious errors of which they’re simply not aware. And errors build up more rapidly than you might expect.”

*Dr. Alan Stevens
Specialist, Mathematical Modeling & Simulation
Rolls-Royce*

“Using PTC Mathcad, we can draw up calculation notes twice as fast, but the real value is in proofing and verification. On average, this stage takes three times less time using PTC Mathcad compared with Microsoft Excel, representing a clear gain in productivity.”

*Sylvain Routeau
Department Head Subsea Structures
Technip*

CURRENT CAPABILITIES

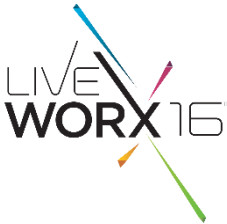
The screenshot shows the PTC Mathcad Prime 3.1 interface. The main workspace displays a physics problem involving a mass-spring-damper system. It includes a symbolic derivation of the displacement function $x(m, b, k, t)$, a comparison of numerical and symbolic solutions, and a graph of the displacement over time. A diagram of the mass-spring-damper system is also shown. The interface features a top menu bar, a left-hand navigation pane, and a bottom status bar. Callouts point to various features:

- Templates to promote re-use and adoption of approved methods**: Points to the top menu bar.
- Multiple document environment**: Points to the document tabs.
- Task-based UI organizes workflows in an intuitive manner**: Points to the top menu bar.
- Integrated headers and footers – just double-click to edit**: Points to the header and footer areas.
- Intuitive function toolbar allows rapid discovery and use**: Points to the function toolbar on the left.
- Collapsible areas help streamline presentation**: Points to the navigation pane.
- Graph-paper interface keeps content organized with clear calculation order**: Points to the main workspace.
- Custom functions that allow re-use of legacy code as functions**: Points to the function toolbar.
- 2D and 3D plots allow direct manipulation - no repetitive dialogs!**: Points to the graph.
- Global definition support**: Points to the variable definitions $m=2$, $b=1$, $k=3$.
- Spec tables and embedded Excel allow organization and calculation**: Points to the calculation area.
- WYSIWYG Page-view, or draft view for extra whiteboard space**: Points to the bottom status bar.
- Symbolic operations, and solving combined with numerics**: Points to the symbolic derivation.
- Enhanced documentation with math-in-text support**: Points to the text and equations.
- Superior Mathematical formatting options**: Points to the formatted equations.
- 64-bit support, multi-threaded calculations**: Points to the bottom status bar.

PTC MATHCAD PRIME 3.1



- Functionality
 - New PTC Creo integration
 - 3 use cases for CAD engineer
 - Document design intent
 - Analysis driven design
 - Verification and validation
 - API
 - Re-written to be cleaner and more efficient
 - Extensive SDK with a dozen code examples including source code to SolidWorks integration
 - Large data handling
 - For 64-bit architectures, data set sizes are no longer limited to 2 gigabyte ceiling
 - Windows 8.1 support
 - Connectivity with third party tools
 - Prode[©] physical properties, CoolProp[©] fluid properties, ODBC-compliant databases
 - Export algorithms to drive CAD surfaces though STL, DXF or IBL formats
 - Read and write in HDF5 file format
 - Export matrices to C++ code
 - PTC Mathcad Worksheet Libraries
 - Over 1,500 pre-built worksheets across:
 - Mechanical, Electrical, Civil & Structural, Chemical, Applied Math and Education
 - Scripts to convert legacy e-books & create HTML TOCs



Spring variable definitions:

Number of Active Coils: $N_{coil} := 18$

Diameter of the wire: $d_{wire} := 7 \text{ mm}$

Coil diameter: $D_{coil} := 28 \text{ mm}$


Outer diameter: $D_{outer} := D_{coil} + d_{wire} = 35 \text{ mm}$

Shear modulus: $G := 77.2 \text{ GPa} = (1.12 \cdot 10^7) \text{ psi}$

Force on the spring: $F_{spring} := \frac{1}{2} (250 \text{ kg} \cdot g) = 1.226 \text{ kN}$

Shear Stress: $\tau := \frac{8 \cdot F_{spring} \cdot D_{coil}}{\pi \cdot d_{wire}^3} + \frac{4 \cdot F_{spring}}{\pi \cdot d_{wire}^2} = 286.673 \text{ MPa}$

Spring Constant: $k_{front_suspension} = \frac{d_{wire}^4 \cdot G}{8 \cdot D_{coil}^3 \cdot N_{coil}} = 58.637 \frac{\text{kN}}{\text{m}}$



Document Design Intent

Coil diameter: $D_{coil} := 28 \text{ mm}$

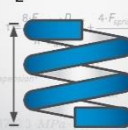
Outer diameter: $D_{outer} := D_{coil} + d_{wire} = 35 \text{ mm}$

Shear modulus: $G := 77.2 \text{ GPa} = (1.12 \cdot 10^7) \text{ psi}$

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Analysis Driven Design


Shear modulus: $G := 77.2 \text{ GPa} = (1.12 \cdot 10^7) \text{ psi}$

Force on the spring: $F_{spring} := \frac{1}{2} (250 \text{ kg} \cdot g) = 1.226 \text{ kN}$

$\tau := \frac{8 \cdot F_{spring} \cdot D_{coil}}{\pi \cdot d_{wire}^3} + \frac{4 \cdot F_{spring}}{\pi \cdot d_{wire}^2} = 286.673 \text{ MPa}$

$k_{front_suspension} = \frac{d_{wire}^4 \cdot G}{8 \cdot D_{coil}^3 \cdot N_{coil}} = 58.637 \frac{\text{kN}}{\text{m}}$

Shear Stress: $\tau := 1753.3 \text{ MPa} \left(\frac{d_{wire}}{\text{UnitsOf}(d_{wire})} \right)^{-3} + 4.33 \text{ GPa} \left(\frac{d_{wire}}{\text{UnitsOf}(d_{wire})} \right)^{-2}$



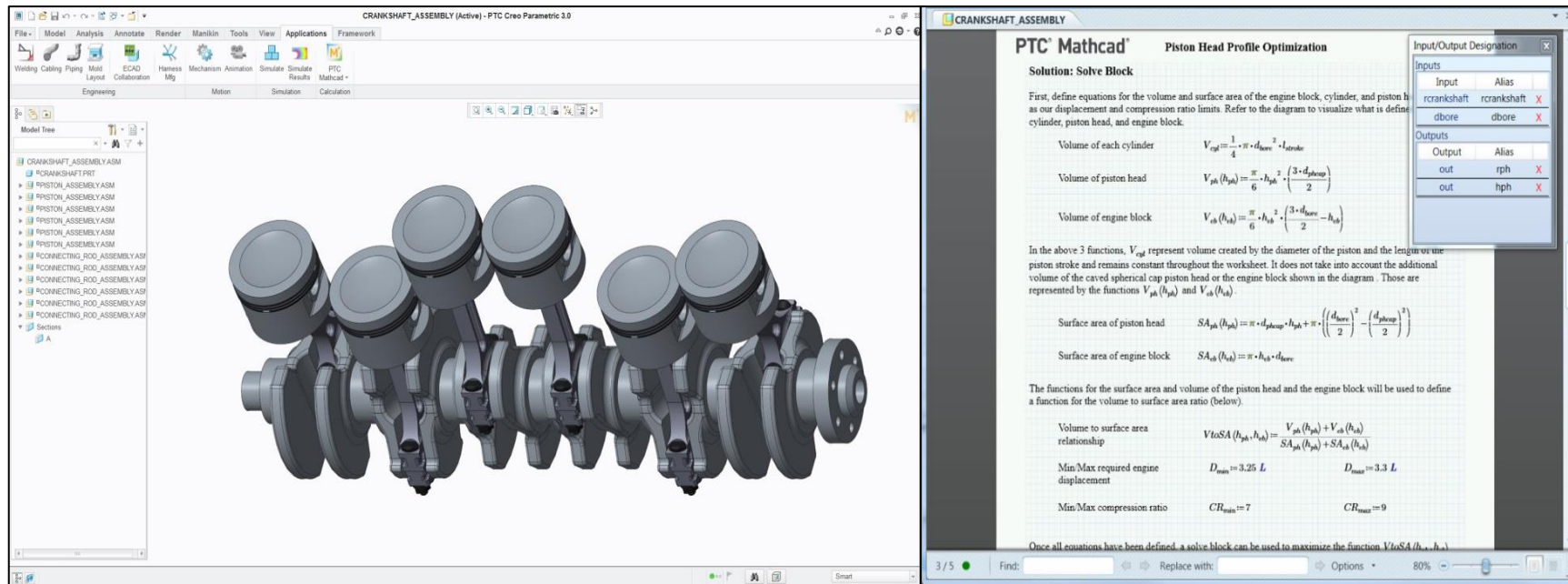
Verification and Validation

ENGINEERING NOTEBOOK, POWERED BY PTC MATHCAD



Document Design Intent

- Embed a Mathcad worksheet directly **within** the Creo model
- Embedded worksheet can be opened, edited and saved within the Creo model
- All design details in the worksheet automatically travel with the Creo model

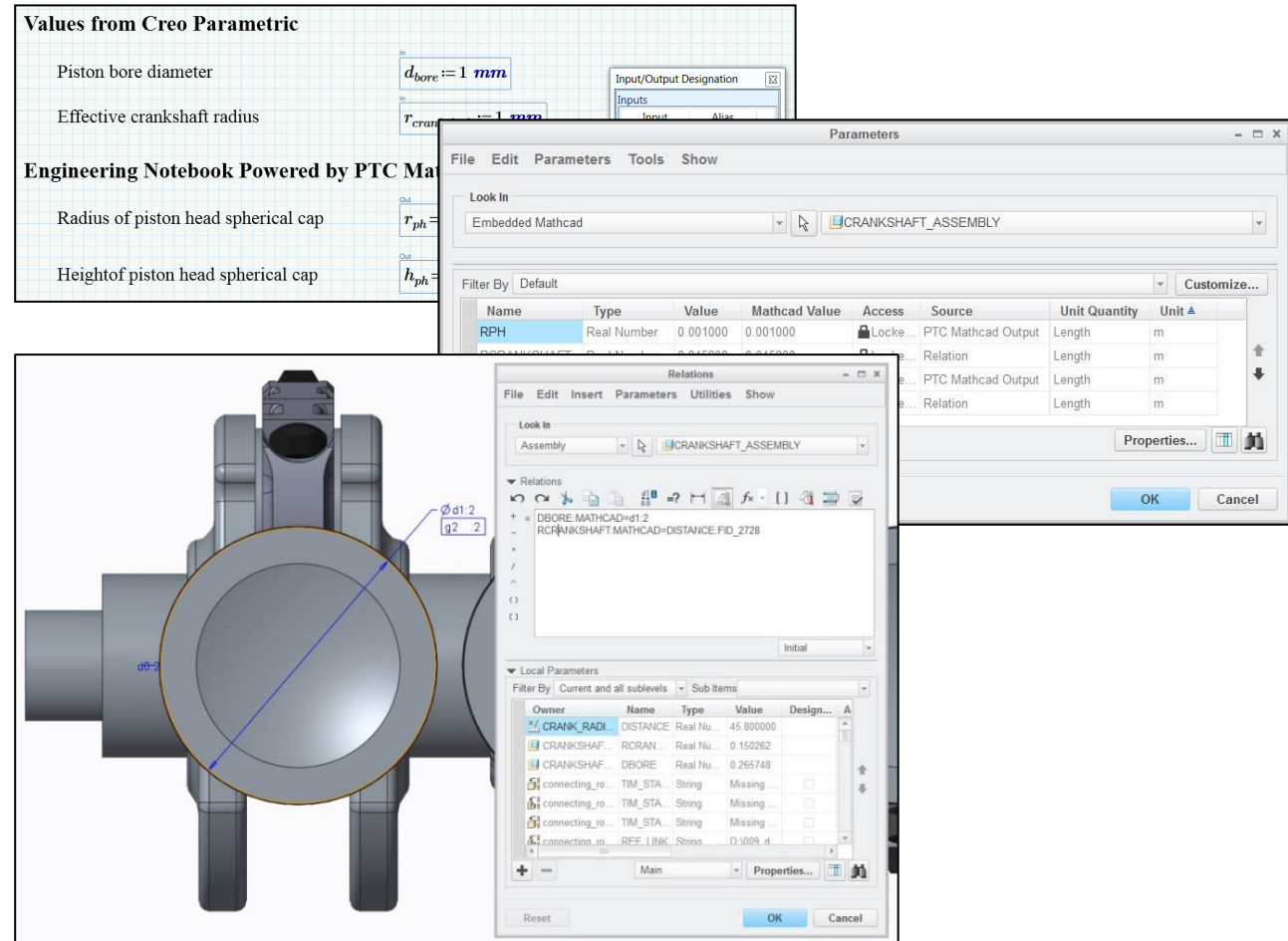


ENGINEERING NOTEBOOK, POWERED BY PTC MATHCAD



Analysis Driven Design and Verification and Validation

- Analysis Driven Design
 - Solve calculations and use the results as dimensions within the Creo model - relate Mathcad outputs to parameters in Creo to use Mathcad values in Creo
- Verification and Validation
 - Creo parameters further analyzed with Mathcad's extensive array of math tools - relate Mathcad inputs to parameters in Creo to use Creo values in Mathcad
- Tag parameters in the embedded Mathcad worksheet
 - Inputs - values from Creo to Mathcad
 - Outputs - values from Mathcad to Creo
- Mathcad input definitions and output evaluations become available in Creo Parameters Table



- PTC Mathcad Gateway is a calculation server that provides access to your company's certified engineering calculations for any user, anytime, on any device. Users can obtain quick calculation results for their specific scenarios without exposing valuable company IP.

Mathcad Calculation Server

Beam Deflection

Drill Verification

ODE Example: Spring Mass System

Find the displacement over time, $x(t)$, of a mass, M , with a dampening weight constant, C , attached to a spring constant, k , that has a horizontal force, $F(t)$.

M

C

k

Worksheets Inputs

M 4

C 5

K 4

Worksheets Outputs

ODEdata

0	0.5
0.5	0.450
1	0.341
1.5	0.221
2	0.116
2.5	0.039
3	-0.009
3.5	-0.034
4	-0.040
4.5	-0.037
5	-0.028
5.5	-0.018
6	-0.010

ODE computing displacement

Displacement

Time

POWERED BY

PTC[®] Mathcad[®]

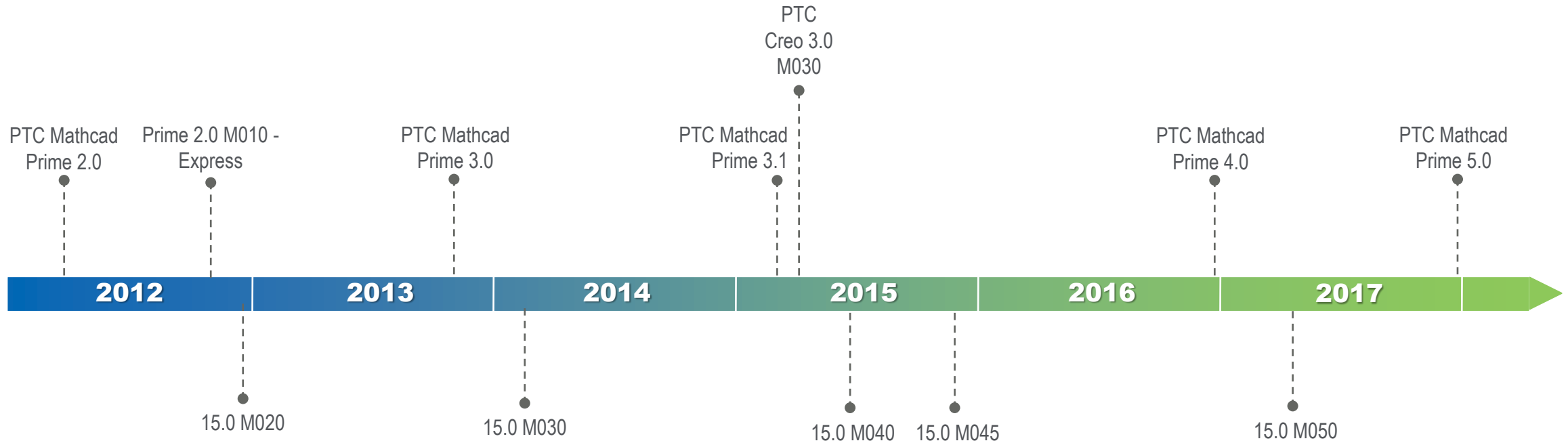
PTC MATHCAD ROADMAP

PTC MATHCAD PRODUCT ROADMAP



- **PTC Mathcad Prime x.0**

- Major releases with new functionality
- From 2016, yearly frequency to match subscription period
- Maintenance releases to address customer-reported issues when necessary

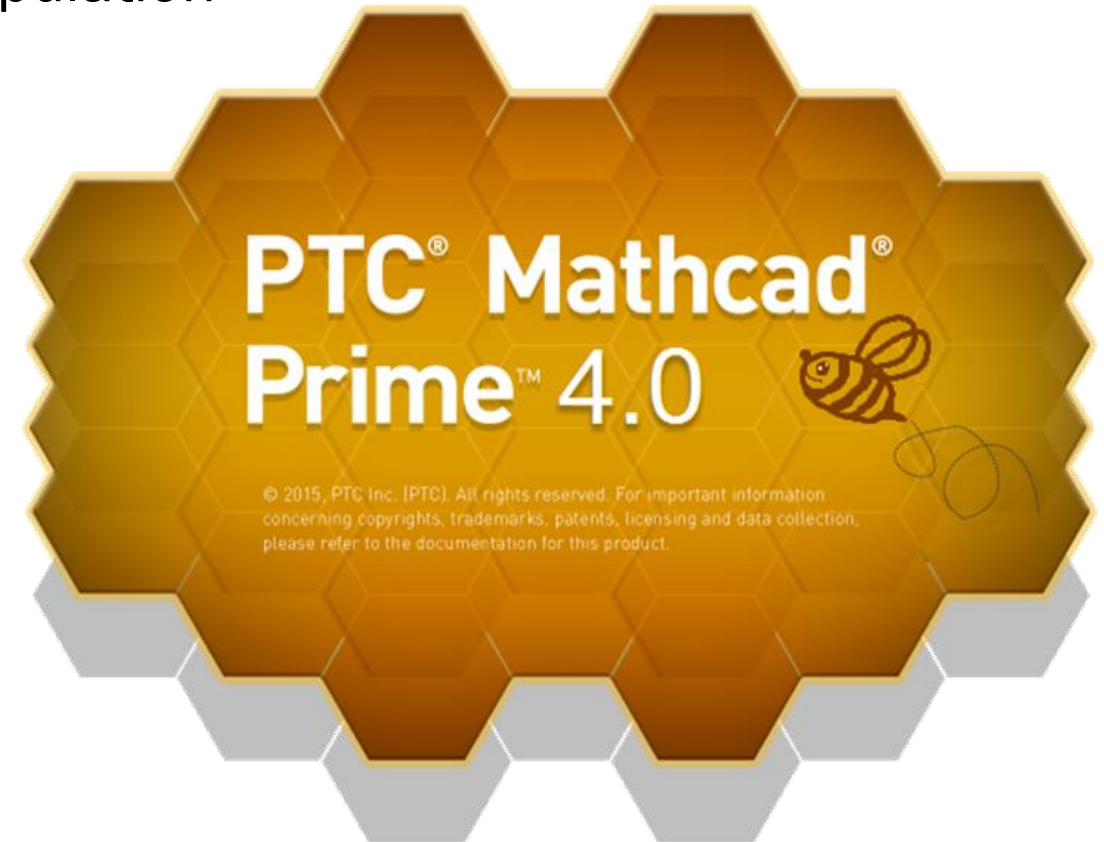


- **PTC Mathcad 15.0**

- Maintenance releases to address customer-reported issues, platform and/or technology changes
- No new features

New functionality:

- Performance improvements in document manipulation
- Mathcad as an OLE container
- Content protection
- Improved copy/paste to other applications
- Equation wrapping
- Windows 10 support
- Computational enhancements



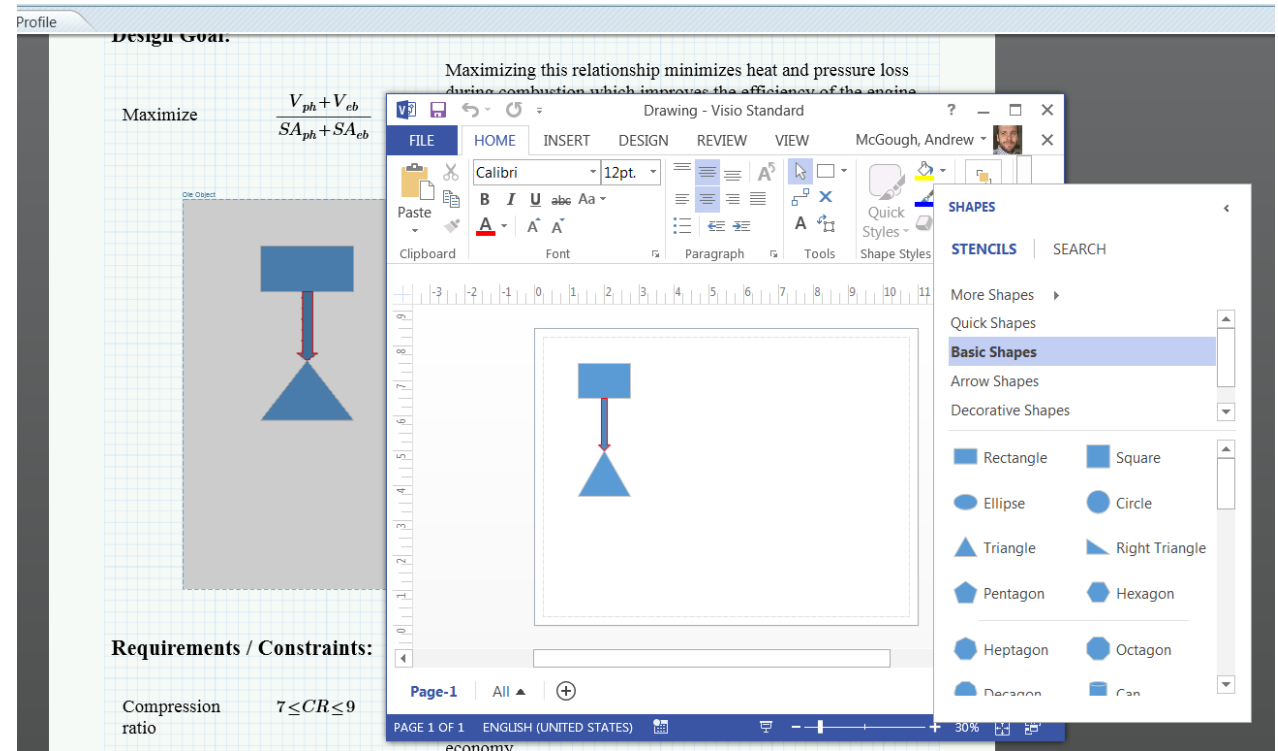
Performance improvements in document manipulation

- Performance improvement of worksheet-level operations (e.g. adding/removing whitespace)
- Performance improvement of region-level operations (e.g. text editing) that can result in worksheet layout change

Main Improvements	Improvement (Worksheet dependent)
Switching between Page/Draft mode	Improved 10 – 30 times
“Orientation” - Page Orientation change (Portrait/Landscape)	Improved 10 – 100 times
“Letter” - Page size change (change page formats A3, A4, ...)	Improved 10 – 40 times
“Margin” – Margin switch between Standard, Narrow and Wide	Improved 10 – 40 times
“Grid Size” – Grid size switch between Fine and Standard.	Improved 10 – 15 times
“Show Grid”	Improved 5 – 10 times
“Add Space”	Improved 5 – 10 times
“Remove Space”	Improved 5 – 10 times
“Add Page Break”	Improved 1.5 – 2 times
“Separate Regions”	Some improvement
Select All	Improved 10 – 40 times
Un-Select All	Improved 10 – 40 times
Math format changes on selected items	Some improvement
Text format changes on selected items	Some improvement
Collapse Area	Some improvement

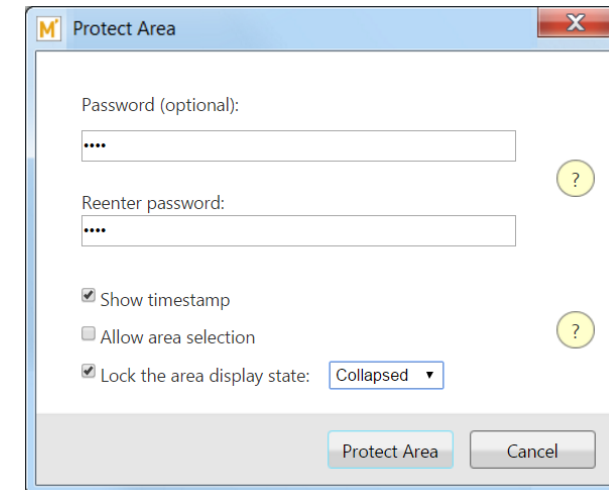
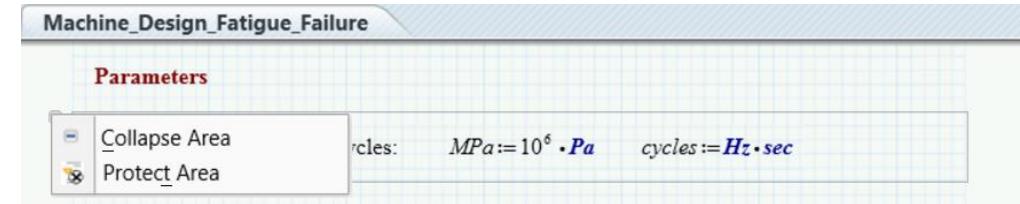
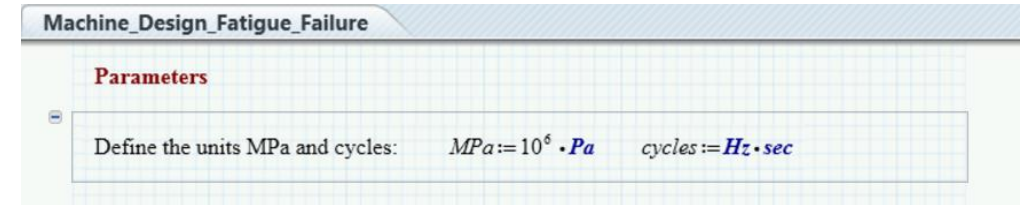
Mathcad as an OLE container

- Ability to embed applications as OLE objects within the worksheet
 - Any OLE object available on the system
 - Can embed new or from file
 - Can link to file



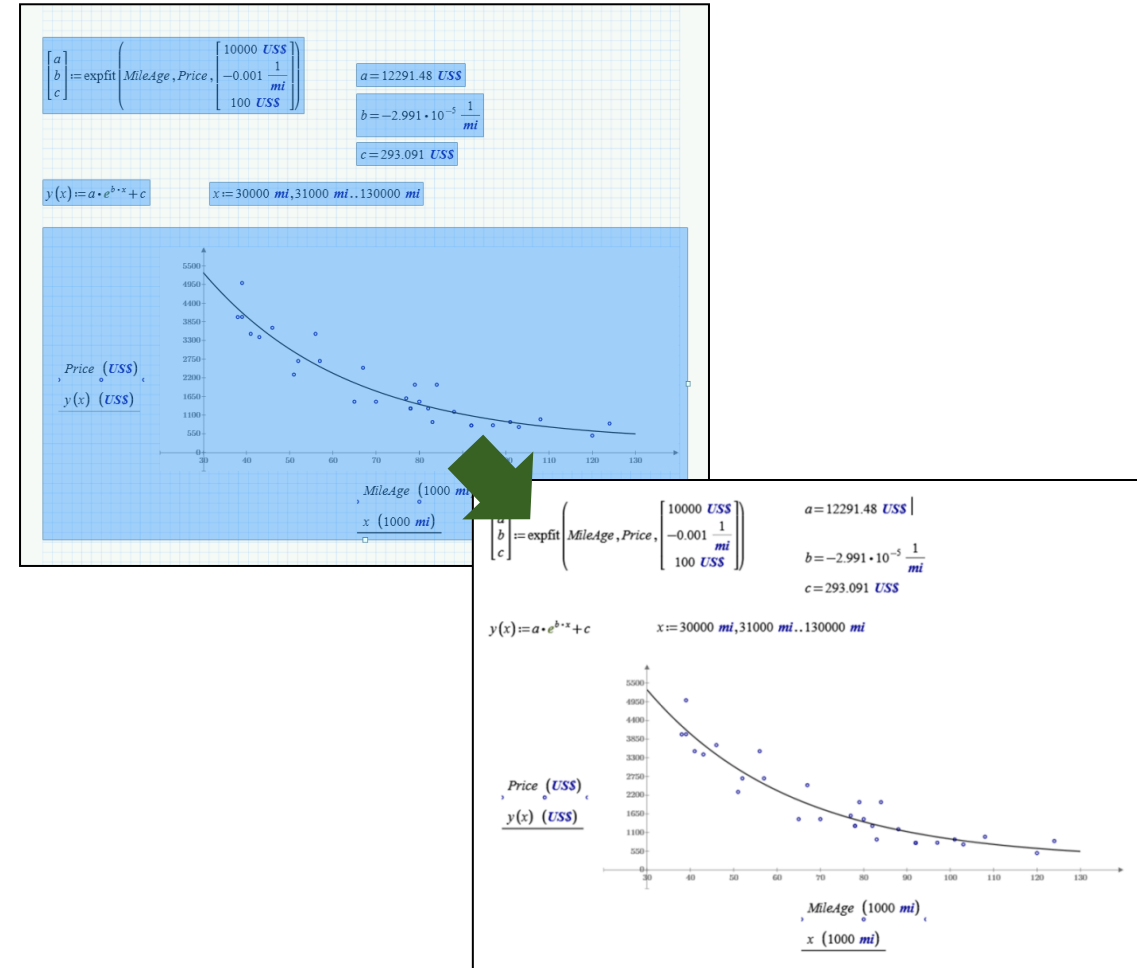
Content Protection – Area Protection/Locking

- Protect/Lock an Area from Edit
 - Protect content from edit (password/no password)
 - Lock area display state (open, closed, no lock)
- Details:
 - Protect from edit and optional lock Area state
 - Password or no Password
 - New RMB option and new RMB on expand icon
 - Default no timestamp, no Area state lock



Improved external app interoperability – copy multiple regions to Word

- Select/copy multiple regions and paste in Word (3rd party apps)
- Details:
 - User can select multiple regions (contiguous or non-contiguous) and ‘copy’
 - Makes available on the clipboard for paste into third party applications
 - All regions paste as images (.png) except text, which pastes as text
 - Text pasted with Mathcad formatting, except:
 - Keep Text Only – apply normal formatting for Word
 - Merge Formatting – keep features such as bullets, maintain some target formatting



Equation Wrapping

- Two ways to enter equation break:
 - Editing an equation
 - ctrl+shift+enter toggles wrap on addition, subtraction, multiplication and inline division operators
 - As you type
 - Four keyboard shortcuts to insert wrapped addition, subtraction, multiplication and inline division operators

For solid cross section Change in horizontal diameter (an increase is positive):

$$D_H := \left(\theta \leq \frac{\pi}{2} \right) \cdot \frac{-w \cdot R^4}{6 \cdot E \cdot I_c \cdot \pi} \cdot (\pi \cdot k_1 \cdot (s^3 + 3 \cdot \theta \cdot c + 4 - 3 \cdot s) + 3 \cdot k_2 \cdot (\pi - \theta + 2 \cdot \theta \cdot c^2 - s \cdot c) - 6 \cdot k_2^2 \cdot (\pi - \theta + s \cdot c)) + \left(\theta > \frac{\pi}{2} \right) \cdot \frac{-w \cdot R^4}{2 \cdot E \cdot I_c}$$

For solid cross section Change in horizontal diameter (an increase is positive):

$$D_H := \left(\theta \leq \frac{\pi}{2} \right) \cdot \frac{-w \cdot R^4}{6 \cdot E \cdot I_c \cdot \pi} \cdot (\pi \cdot k_1 \cdot (s^3 + 3 \cdot \theta \cdot c + 4 - 3 \cdot s) + 3 \cdot k_2 \cdot (\pi - \theta + 2 \cdot \theta \cdot c^2 - s \cdot c) - 6 \cdot k_2^2 \cdot (\pi - \theta + s \cdot c)) \downarrow + \left(\theta > \frac{\pi}{2} \right) \cdot \frac{-w \cdot R^4}{2 \cdot E \cdot I_c \cdot \pi} \cdot (\pi \cdot k_1 \cdot (c \cdot (\pi - \theta) + s - \frac{s^3}{3}) + k_2 \cdot ((\pi - \theta) \cdot (2 \cdot s^2 - 1) - s \cdot c) + 2 \cdot k_2^2 \cdot (\pi - \theta + s \cdot c))$$

Change in vertical diameter (an increase is positive):

$$D_V := \frac{w \cdot R^4}{6 \cdot E \cdot I_c \cdot \pi} \cdot \left(\pi \cdot k_1 \cdot \left(\frac{2 - c^3}{+3 \cdot c} \right) + 3 \cdot k_2 \cdot \left(\frac{2 \cdot \theta \cdot s^2 - \theta + s \cdot c}{-\pi \cdot (1 + 2 \cdot c + s^2)} \right) + 6 \cdot k_2^2 \cdot \left(\frac{\pi - \theta}{+s \cdot c} \right) \right)$$

$$\Delta L := \left(\theta \leq \frac{\pi}{2} \right) \cdot \frac{w \cdot R^4}{12 \cdot E \cdot I_c \cdot \pi} \cdot \left(\begin{array}{l} 1.5 \cdot \pi \cdot (\theta - 2 \cdot \theta \cdot s^2 - s \cdot c) \downarrow \\ 2 \cdot k_1 \cdot (2 \cdot \pi + s^3 + 3 \cdot \theta \cdot c - 3 \cdot s) \downarrow \\ \div 3 \cdot k_2 \cdot (s \cdot c + \theta \cdot \pi + 2 \cdot \theta \cdot s^2 - 3 \cdot \pi - \theta - \pi \cdot s \cdot c) \downarrow \\ + 6 \cdot k_2^2 \cdot (\pi - \theta + s \cdot c) \end{array} \right) \downarrow + \left(\theta > \frac{\pi}{2} \right) \cdot \frac{w \cdot R^4}{12 \cdot E \cdot I_c \cdot \pi} \cdot \left(\begin{array}{l} 1.5 \cdot \pi \cdot ((\pi - \theta) \cdot (1 - 2 \cdot s^2) + s \cdot c) \downarrow \\ + 2 \cdot k_1 \cdot (2 \cdot \pi + s^3 + 3 \cdot \theta \cdot c - 3 \cdot s - \pi \cdot c^3) \downarrow \\ + 3 \cdot k_2 \cdot ((\pi + 1) \cdot (\pi - \theta + s \cdot c) + 2 \cdot \theta \cdot s^2 - 4 \cdot \pi \cdot (1 + c)) \downarrow \\ + 6 \cdot k_2^2 \cdot (\pi - \theta + s \cdot c) \end{array} \right)$$

PTC MATHCAD ROADMAP



- Subsequent Release Themes

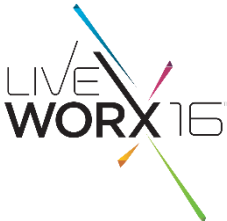
- Yearly releases

- Prime 5.0 December 2017
 - Plot Enhancements - Embed 3rd party tool to match Mathcad 15.0 plots on first release
 - Math engine refactoring
 - TBD
- Prime 6.0 December 2018
 - Content TBD
- Prime 7.0 December 2019
 - Content TBD

- Candidate functionality examples

- Constrained inputs (input controls)
- Picture operator
- Scripted controls
- Gradient operator
- Hyperlinks
- Redefinition warnings
- Text styles
- Custom margins
- PTC Creo integration phase II
- API enhancements
- Additional 3rd party integrations

PRIME 5.0 PLOT ENHANCEMENTS



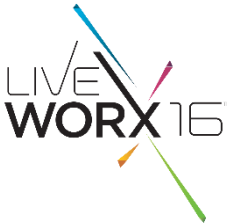
PTC Mathcad 15.0 X-Y Plots

The image displays four screenshots of the 'Formatting Currently Selected X-Y Plot' dialog box, illustrating various configuration options:

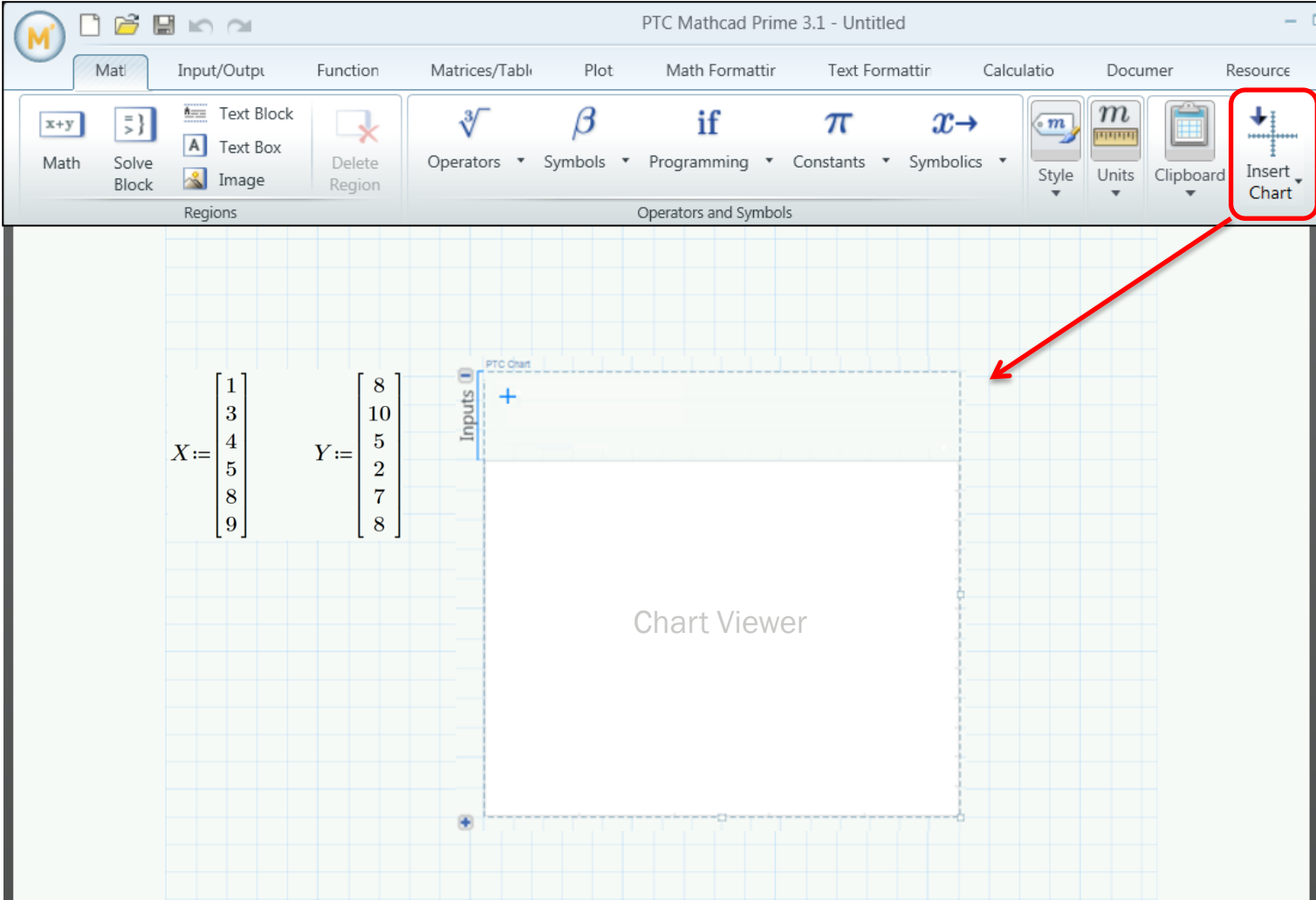
- Top Left Screenshot (X-Y Axes Tab):** Shows options for enabling a secondary Y-axis, X-axis settings (Log scale, Grid lines, Numbered, Auto scale, Show markers, Auto grid, Number of grids: 2), Primary Y-axis settings, Secondary Y-axis settings, and Axis Style (Boxed, Crossed, None, Equal scales).
- Top Right Screenshot (Traces Tab):** Shows a table for configuring multiple traces and legend placement options.
- Bottom Left Screenshot (Number Format Tab):** Shows format options (General, Decimal, Scientific, Engineering, Fraction), Number of decimal places (3), Show trailing zeros, Show exponents in engineering format, and Exponential threshold (3).
- Bottom Right Screenshot (Labels Tab):** Shows Title placement (Above, Below, Show Title) and Axis labels (X-Axis, Y-Axis, Y2-Axis).

A legend dropdown menu with the following options: lines, points, error bar, step, draw, stem, solidbar.

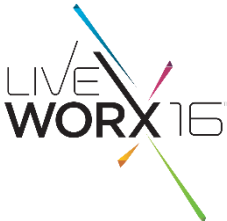
PRIME 5.0 PLOT ENHANCEMENTS



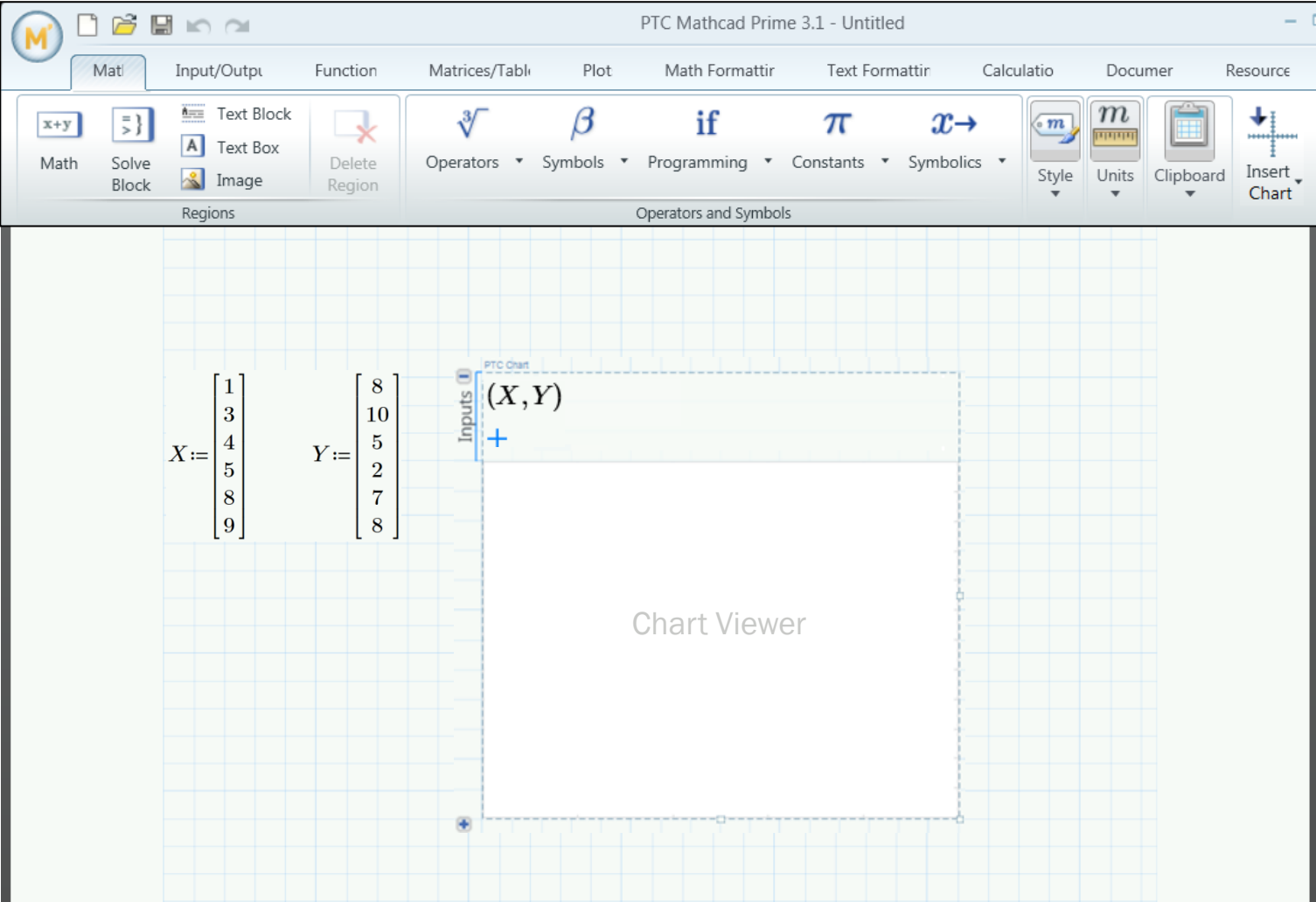
- Insert Chart object



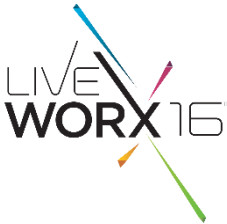
PRIME 5.0 PLOT ENHANCEMENTS



- Type data series



PRIME 5.0 PLOT ENHANCEMENTS



- Double-click chart area to activate chart + its associated Ribbon UI

The screenshot shows the PTC Mathcad Prime 3.1 interface. The main workspace contains two matrices: $X := \begin{bmatrix} 1 \\ 3 \\ 4 \\ 5 \\ 8 \\ 9 \end{bmatrix}$ and $Y := \begin{bmatrix} 8 \\ 10 \\ 5 \\ 2 \\ 7 \\ 8 \end{bmatrix}$. A chart window is open, displaying a line graph with a red line. The chart has a white background and a black border. The x-axis is labeled from 0 to 10, and the y-axis is labeled from 0 to 12. The ribbon UI for the chart is active, showing the Chart tab with options for Canvas, Graph, Legend, Title, and Set-Up. The Chart tab is expanded, showing options for Canvas Border, Background, and 3D Effects.

PRIME 5.0 PLOT ENHANCEMENTS



- On the relevant tab, select 'Chart Title' and fill in text

The screenshot shows the PTC Mathcad Prime 3.1 interface. On the left, two matrices are defined:

$$X := \begin{bmatrix} 1 \\ 3 \\ 4 \\ 5 \\ 8 \\ 9 \end{bmatrix} \quad Y := \begin{bmatrix} 8 \\ 10 \\ 5 \\ 2 \\ 7 \\ 8 \end{bmatrix}$$

In the center, the 'Chart' tab is active in the 'Traces Styles' panel. The 'Chart Title' section is expanded, showing the following settings:

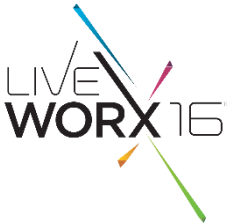
- Chart Title
- Text: Test Data 04/11/15
- Location: Top (dropdown), Center (dropdown)
- Font: Arial (dropdown)
- Color: Black (dropdown)
- Styles: Bold (checkbox checked), Italic (checkbox unchecked)
- Size: 12 (dropdown)
- Angle: 0 (dropdown)

The 'Box' section is also visible but not expanded.

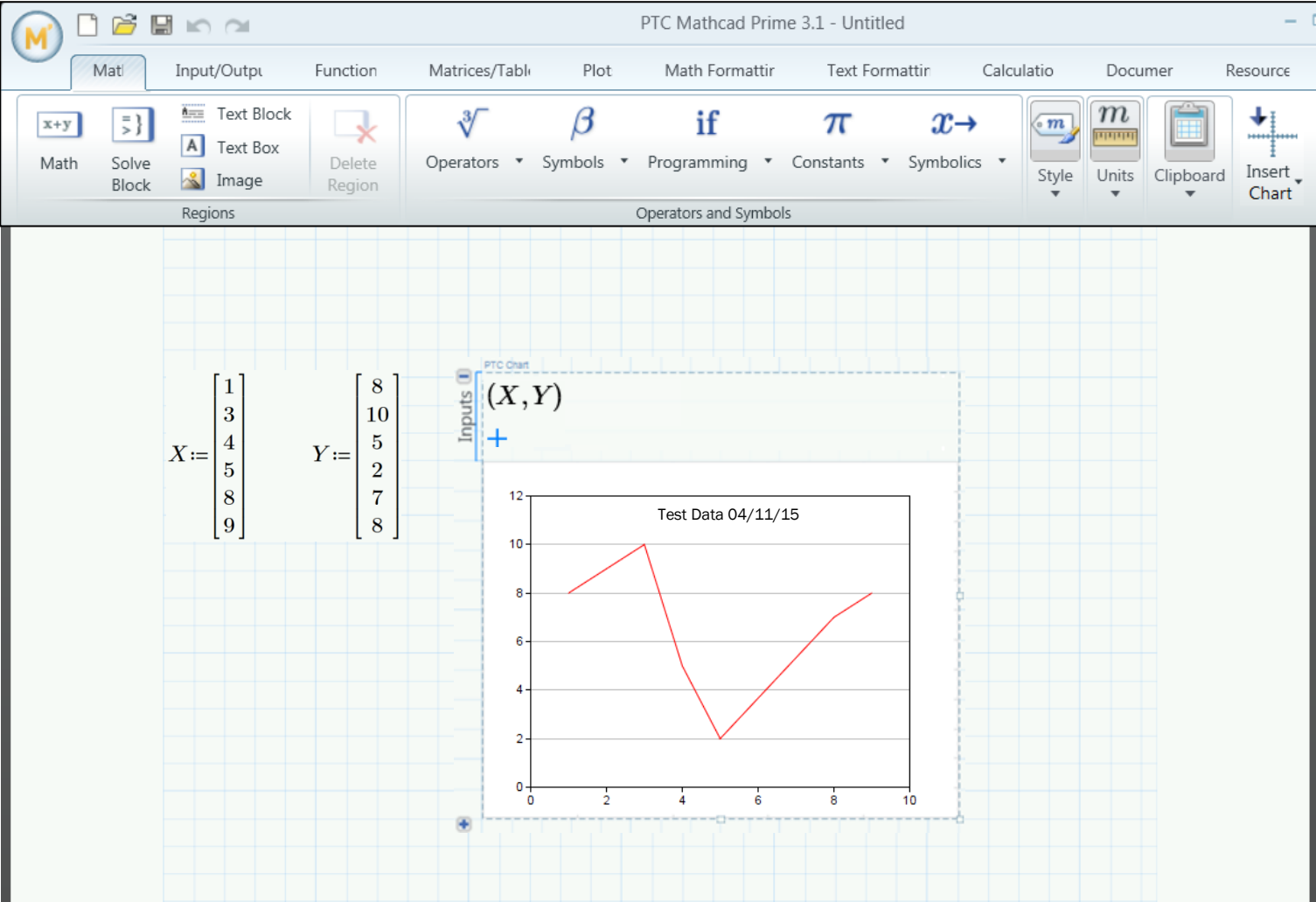
On the right, a line chart is displayed with the title 'Test Data 04/11/15'. The chart shows a red line connecting the following data points:

X	Y
1	8
3	10
4	5
5	2
7	7
8	8

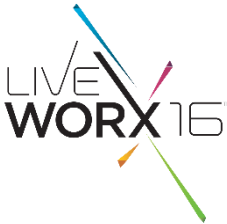
PRIME 5.0 PLOT ENHANCEMENTS



- Close external app to return to Mathcad



PRIME 5.0 PLOT ENHANCEMENTS



Minimize input area and de-select

The screenshot shows the PTC Mathcad Prime 3.1 interface. The title bar reads "PTC Mathcad Prime 3.1 - Untitled". The ribbon includes tabs for "Mat", "Input/Output", "Function", "Matrices/Tables", "Plot", "Math Formatting", "Text Formatting", "Calculations", "Documents", and "Resources". The "Plot" tab is active, showing icons for "Style", "Units", "Clipboard", and "Insert Chart".

In the workspace, two matrices are defined:

$$X := \begin{bmatrix} 1 \\ 3 \\ 4 \\ 5 \\ 8 \\ 9 \end{bmatrix} \quad Y := \begin{bmatrix} 8 \\ 10 \\ 5 \\ 2 \\ 7 \\ 8 \end{bmatrix}$$

To the right, a plot titled "Test Data 04/11/15" is shown. The x-axis ranges from 0 to 10, and the y-axis ranges from 0 to 12. The plot displays a red line connecting the following data points:

X	Y
1	8
3	10
4	5
5	2
8	7
9	8

The image features several colorful geometric shapes, primarily triangles and lines, scattered across the background. A large, multi-colored triangular shape is prominent on the right side, composed of various shades of blue, green, yellow, orange, and purple. Several thin, colored lines (blue, pink, green, orange) radiate from the center of the text area. The text 'LIVE WORX 16' is the central focus, with 'LIVE' in a thin, outlined font and 'WORX 16' in a bold, solid black font. A small 'TM' trademark symbol is positioned to the upper right of the '6'.

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