PTC® PRODUCT & SERVICE ADVANTAGE

PTC Mathcad: Product Update and Roadmap

Mayur Agare
Technical Sales Specialist

- Why PTC Mathcad?
- What is PTC Mathcad?
- Release Schedule
- PTC Mathcad Express
- PTC Mathcad Prime 3.0
- Beyond Prime 3.0

Why PTC Mathcad?

Common Engineering Symptoms & Possible Causes

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Some primary themes

Symptom		Possible root cause
Failures across extended / diverse engineering teams	→	Unit errors between heterogeneous design tools
Slow / inaccurate development of *new* designs	→	Inefficient application of design best-practices
Inefficiency / duplication during *derivative* designs	→	Limited re-use of previous, proven engineering analyses
Loss of expertise / competitive advantage	→	Analyses are trapped in intangible / unusable forms

Specific PTC Mathcad solutions

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- Possible root cause
  - Unit errors due to exchanging values without units across tools and team

fx =A2*B2

	A	B	C
1	F	l	T
2	2800	7	19600
3			

fx =A2*B2*0.0254

	A	B	C
1	F (kN)	l (in)	T (kN*m)
2	2800	7	497.84
3			

- PTC Mathcad solution
  - Explicit unit handling throughout calculations with automatic unit conversion

$$F := 2800\ kN$$

$$F = \left(6.295 \cdot 10^{5}\right)\ lbf$$

$$l := 7\ in$$

$$l = 17.78\ cm$$

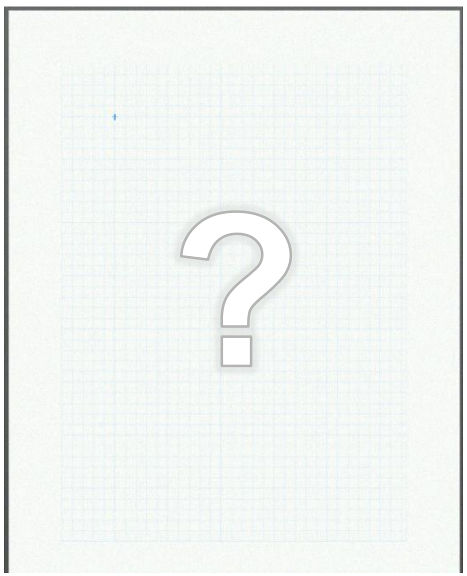
$$T := l \cdot F$$

$$T = \left(3.672 \cdot 10^{5}\right)\ ft \cdot lbf$$

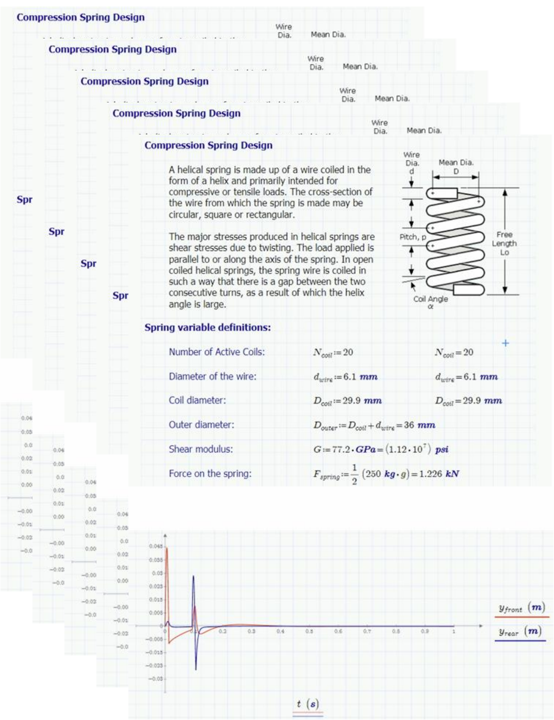
$$T = 497.84\ kN \cdot m$$

Specific PTC Mathcad solutions

- Possible root cause
  - Inefficient application of design best-practice



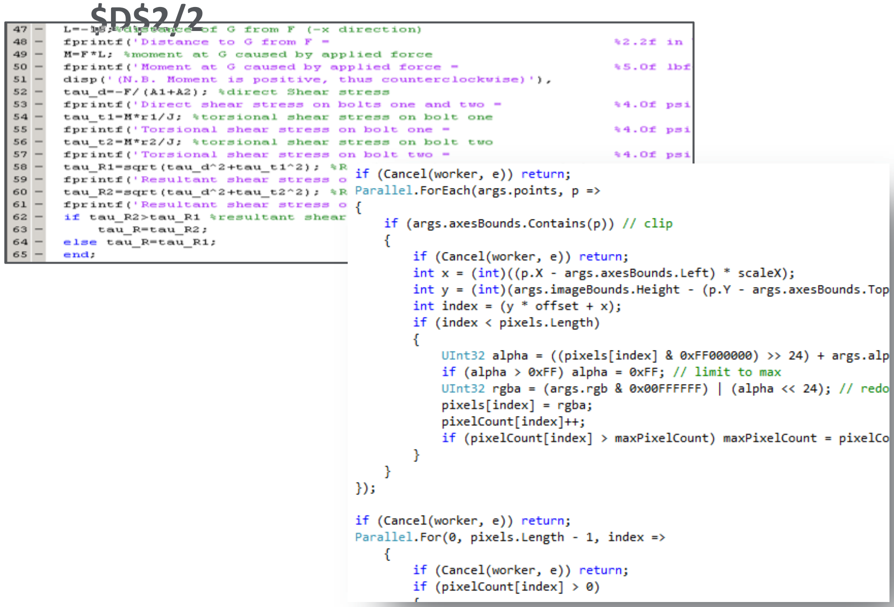
- PTC Mathcad solution
  - New design best-practice using standard design procedure implemented as PTC Mathcad example worksheets and templates

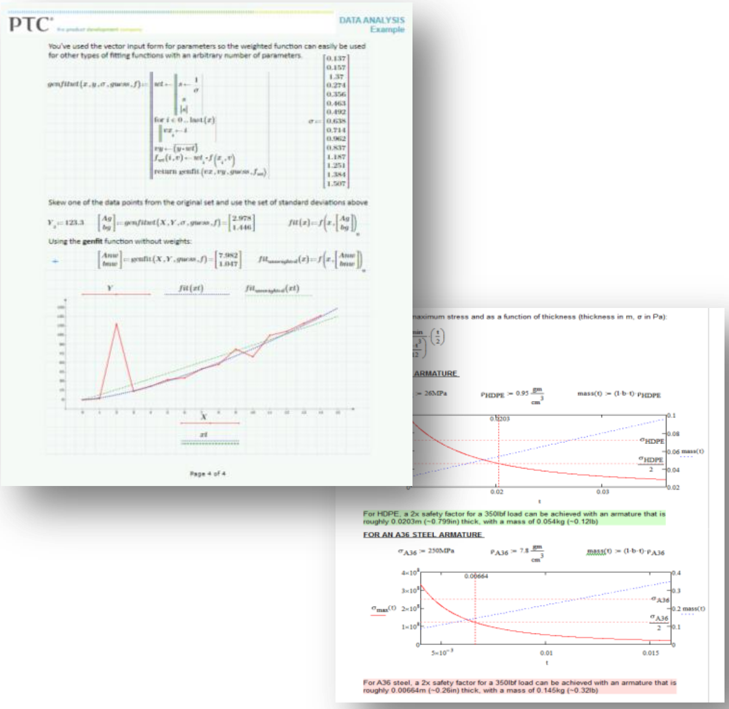


- Possible root causes
  - Limited re-use of previous, proven engineering analyses
  - Analyses are trapped in intangible / unusable forms

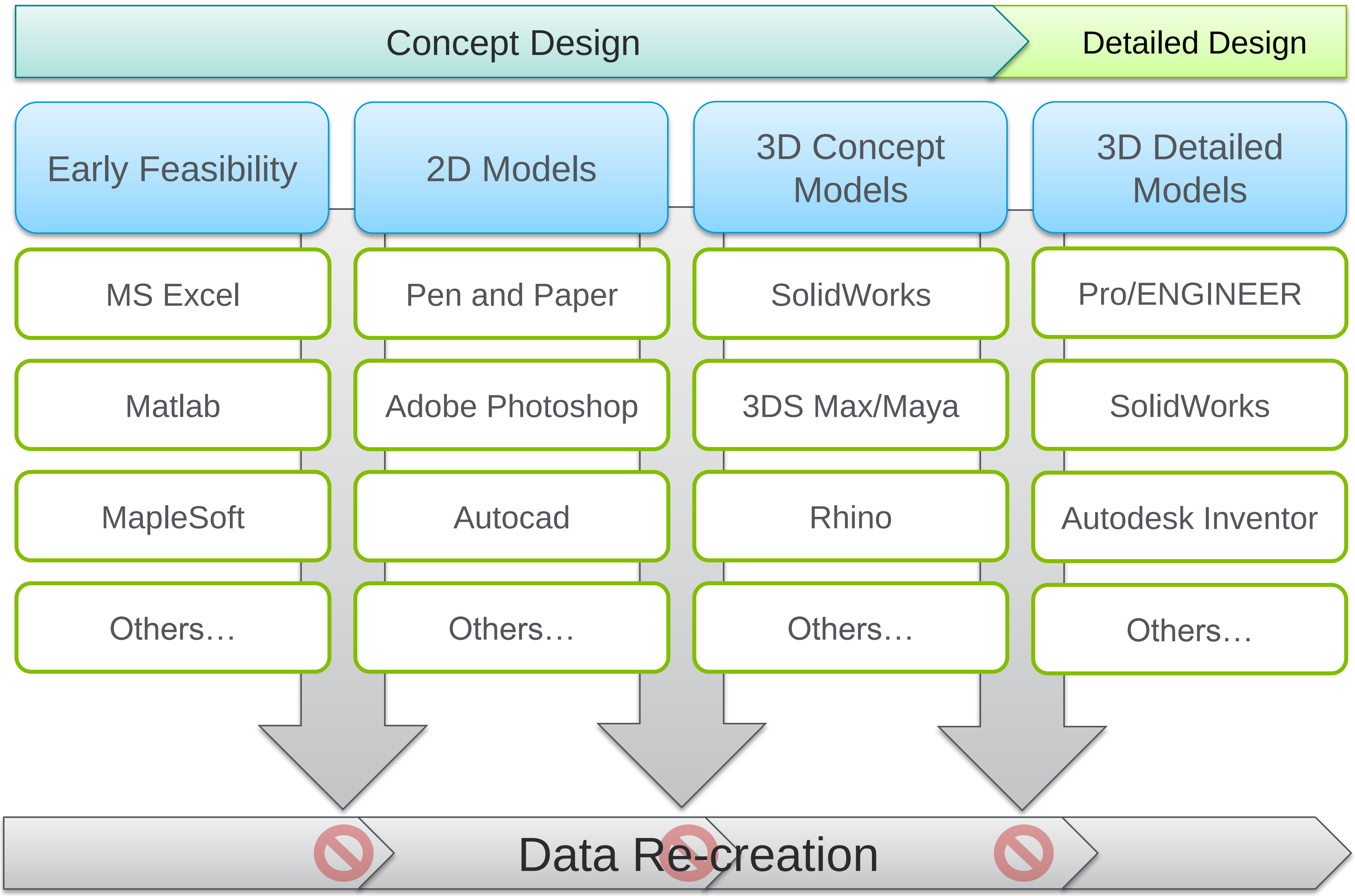
- PTC Mathcad solution
  - Live, calculating, *readable* documents
  - Use of natural math notation
  - Inclusion of text, math and graphics in single document

=($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

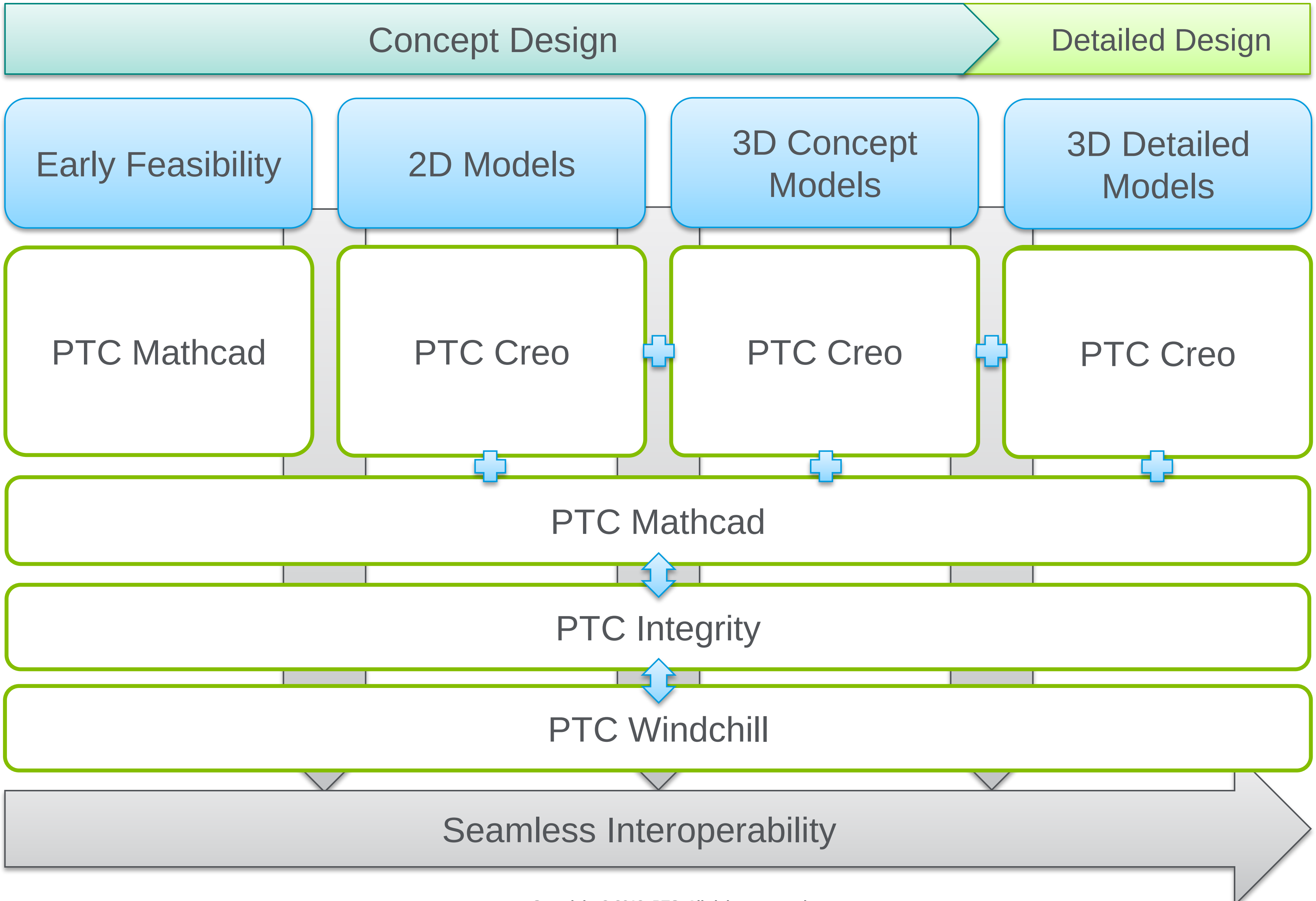




Analysis Driven Design: The Reality



Analysis Driven Design: The Vision



PTC Mathcad Upholding Requirements in CAD Geometry

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A system engineering view of a product development timeline

Challenge #1

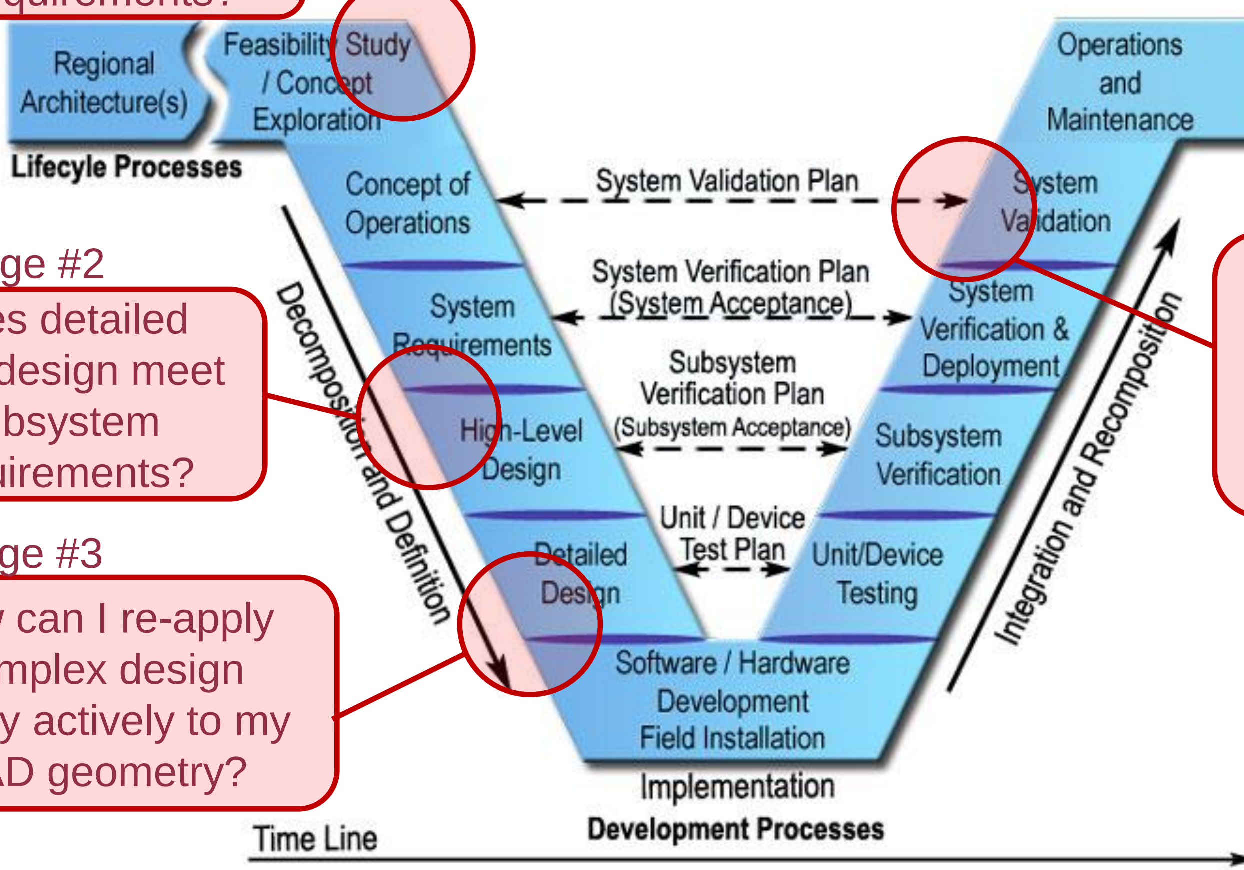
Can we solve these market requirements?

Challenge #2

Does detailed CAD design meet subsystem requirements?

Challenge #3

How can I re-apply complex design theory actively to my CAD geometry?



Challenge #4

After the 3D modeling is done, do we know that it will uphold the system level requirements?

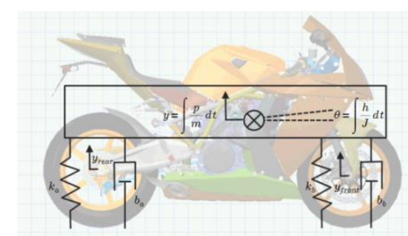


Image source:

U.S. Department of Transportation Federal Highway Administration

PTC Mathcad Upholding Requirements in CAD Geometry

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A system engineering view of a product development timeline

Scenario #1

Perform early feasibility studies

Scenario #2

Verify subsystem operation, using CAD geometry

Scenario #3

Re-apply design guidelines to create known-good CAD configurations

Scenario #4

System validation performed on entire CAD assembly to ensure operational requirements are met

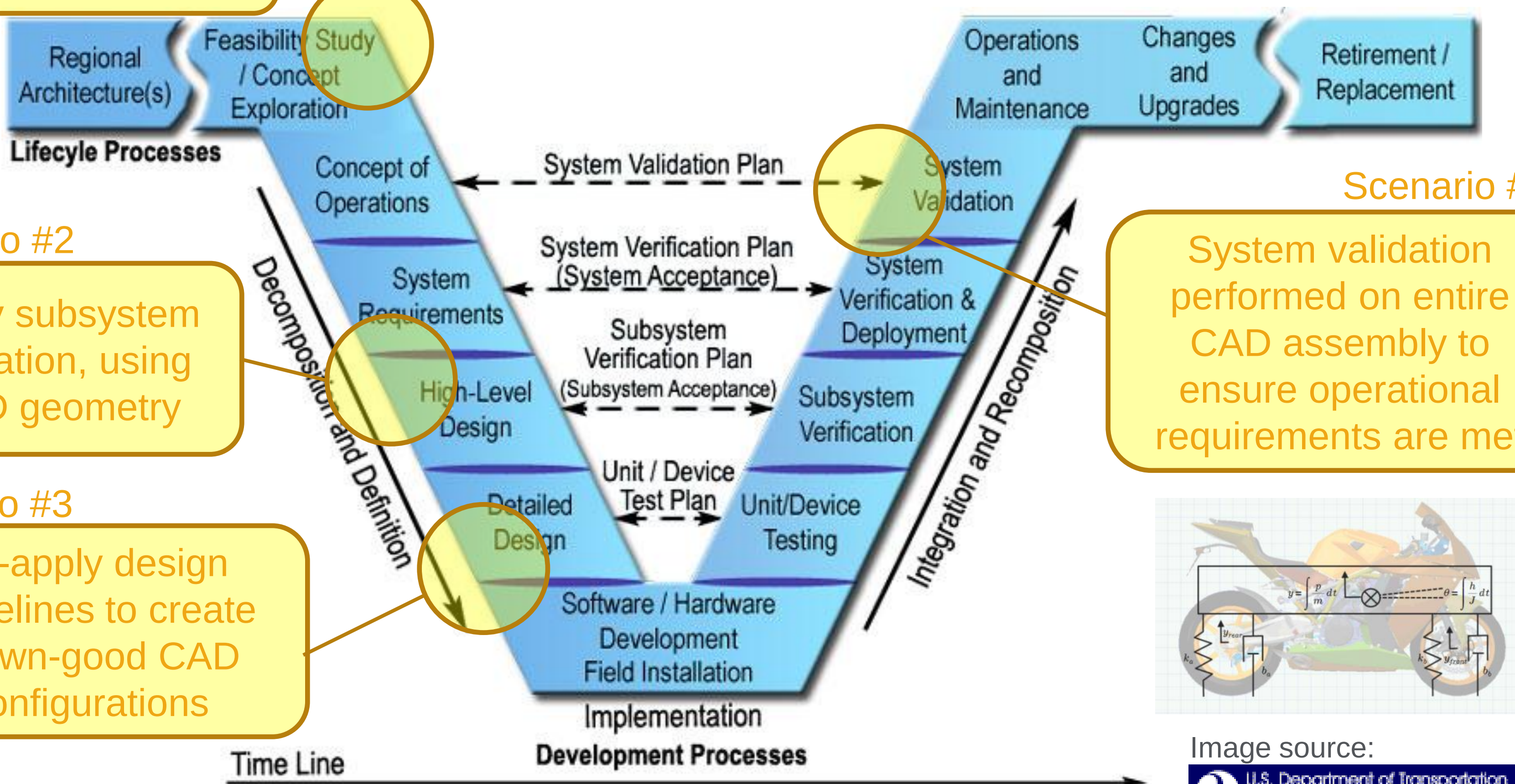


Image source:

U.S. Department of Transportation Federal Highway Administration

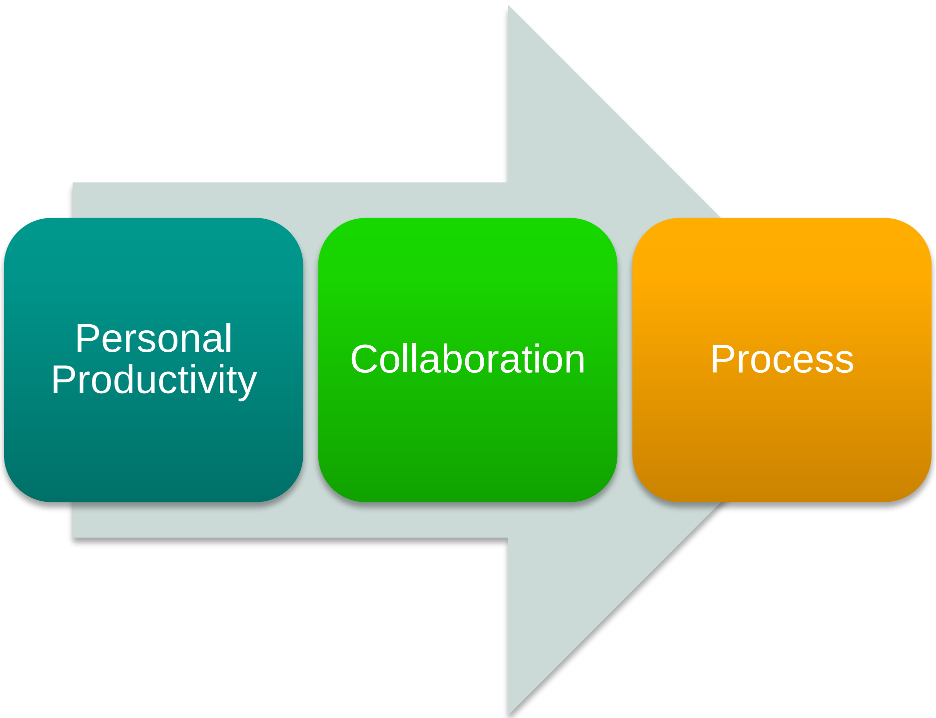
PTC Mathcad Prime

Product Strategy Review

Why PTC Mathcad Prime?

PTC Mathcad has been an established product in the market since late 80's. Why re-invent it?

- PTC Mathcad as de-facto standard for engineering calculations
  - Personal productivity
  - Collaboration
  - Process
- Market trends
  - Support IP capture and standardization
  - New workforce
- User expectations
  - Modern UI
  - Easy to learn
  - Focus on engineering (not programming)
- Technology Trends
  - Keeping up with Microsoft technology
- Challenge
  - Satisfy needs of existing and new users



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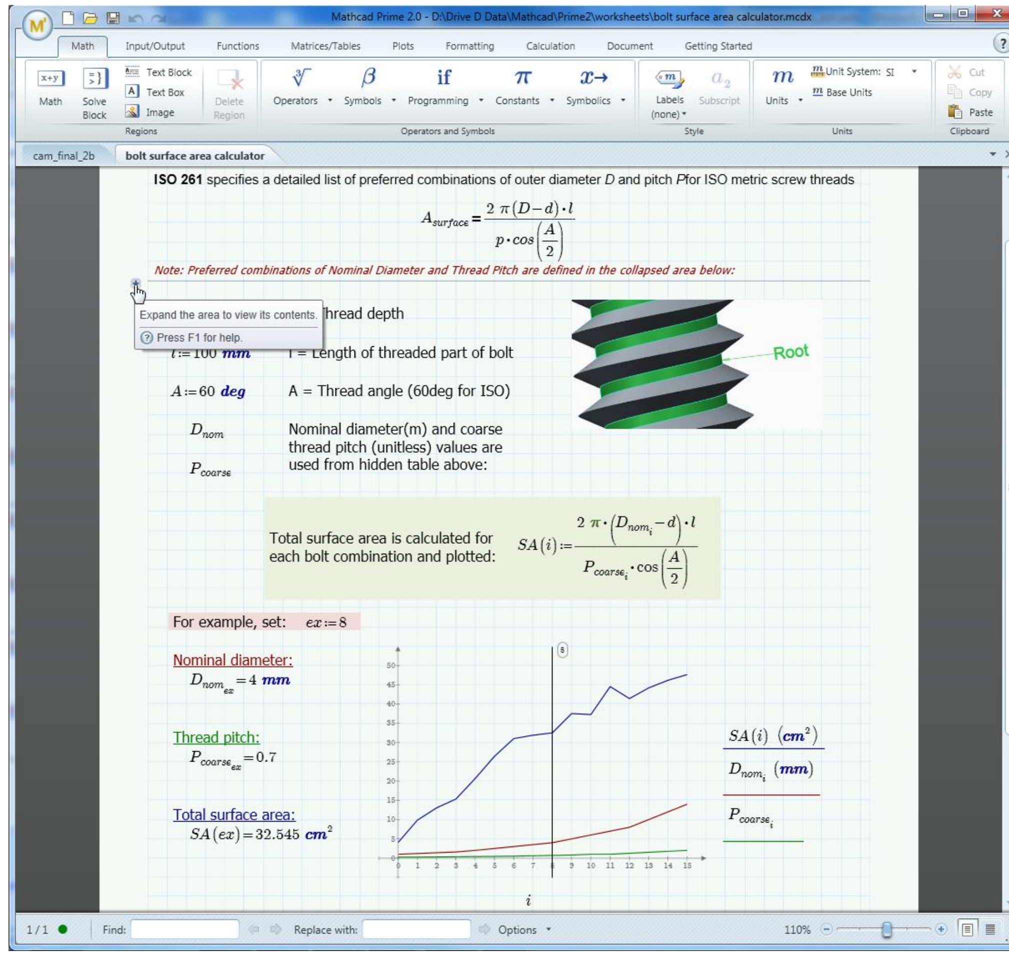
- User Experience: New User Interface (UI)
  - Completely rewritten UI (15 minute problem)
    - Modern look and feel
    - Usability, discovery, learnability
    - Task oriented
    - Document centric



What is PTC Mathcad Prime …

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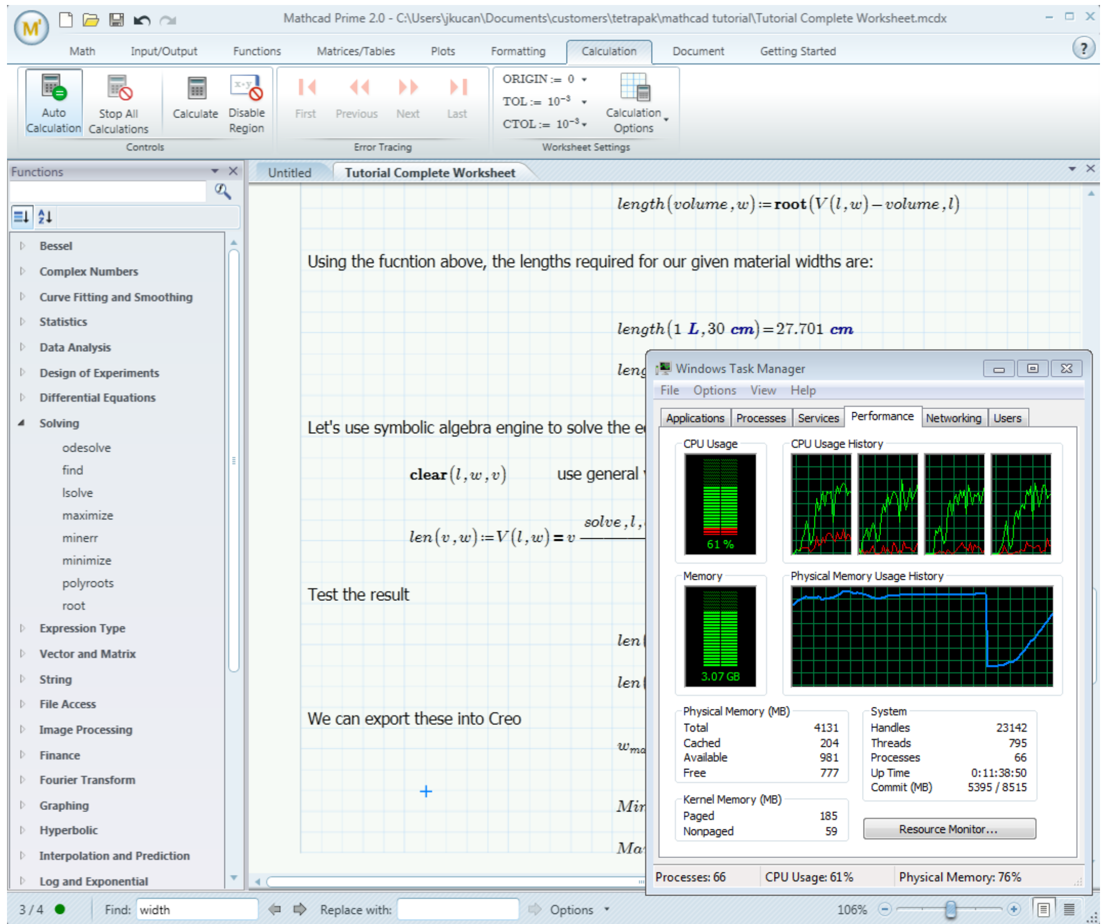
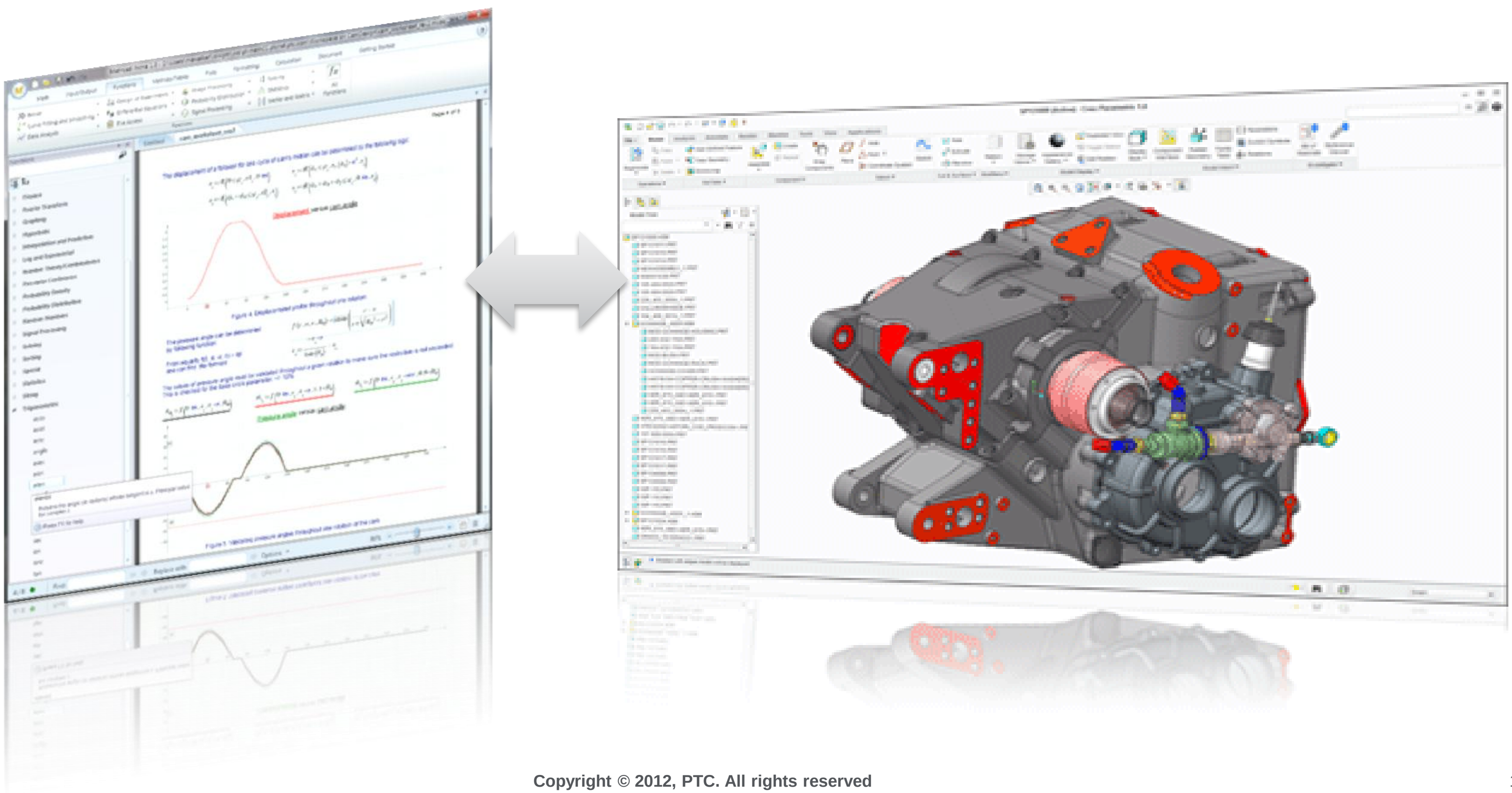
- Computational Power: PTC Mathcad Calculation Engine
  - Major improvements the PTC Mathcad calculation engine
    - Robust and flexible unit checking
    - 64bit
    - Multi-threading
    - Enhanced to numerics



What is PTC Mathcad Prime …

- Integration: Working within Engineering Ecosystem
  - Integrating with CAD (e.g. PTC Creo)
  - Integrating with requirements management (e.g. PTC Integrity)
  - Open architecture



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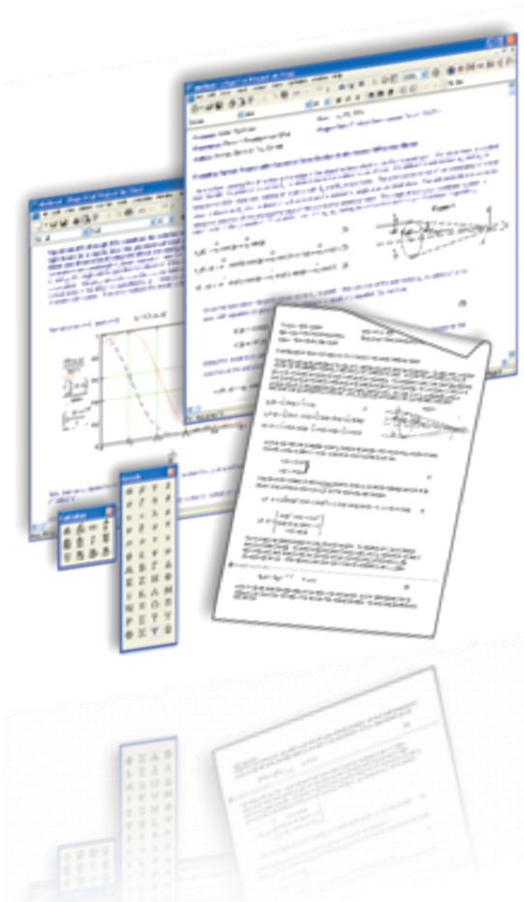
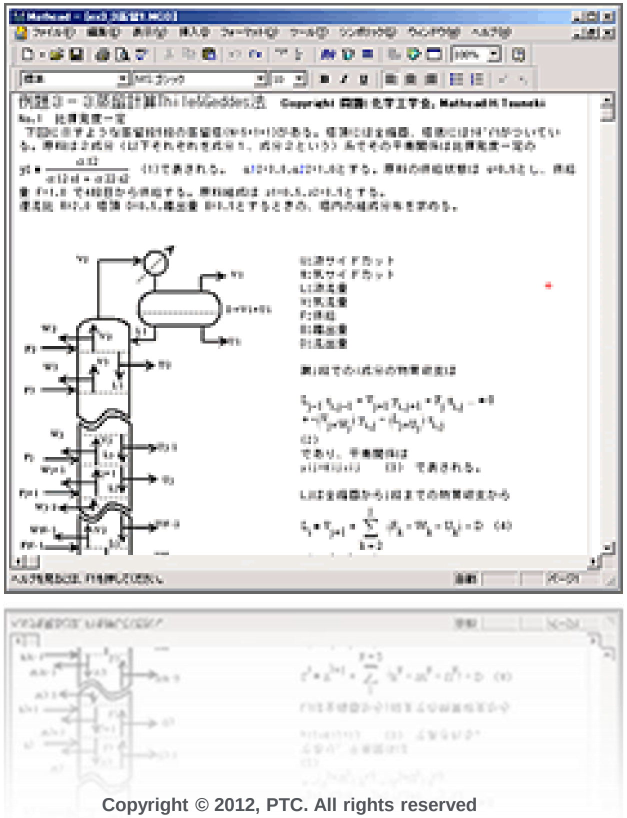
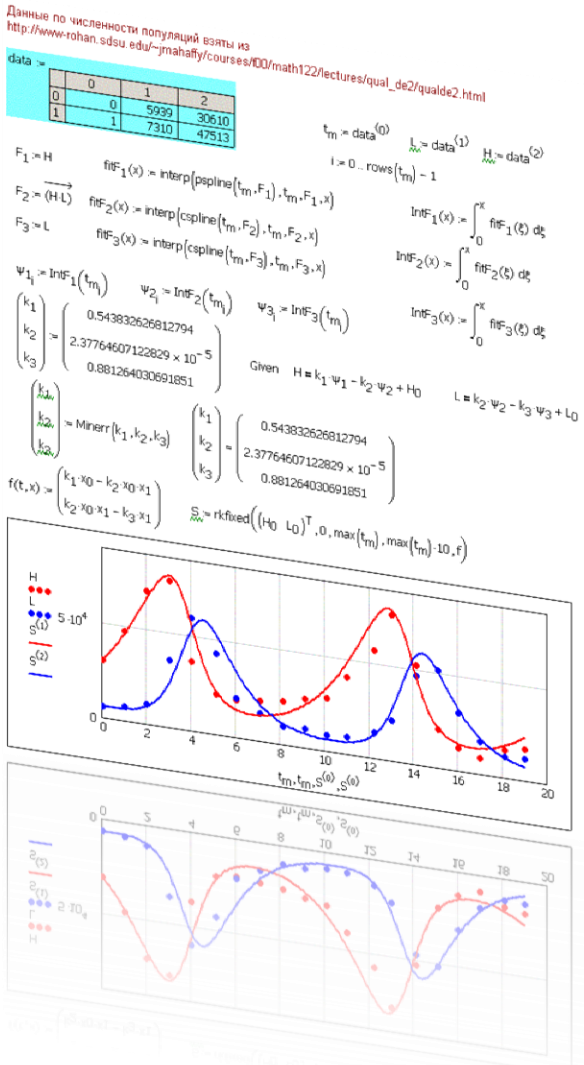
- Content: Preserving Intellectual Property
  - Standards-based format
  - Conversion from prior versions







Product Schedule

Release Schedule

Milestones

- Nov 2011: PTC Mathcad 15.0 M010
- Feb 2012: PTC Mathcad Prime 2.0
- Oct 2012: PTC Mathcad Express/PTC Mathcad Prime 2.0 M010
- Nov 2012: PTC Mathcad 15.0 M020
- Planned…
- Jan 2013: PTC Mathcad Prime 3.0 *alpha*
- Spring 2013: PTC Mathcad Prime 3.0
- …

Forward looking information, subject to change without notice

Release Schedule

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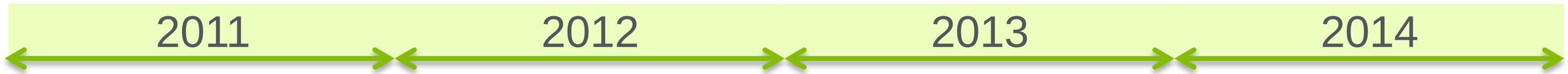
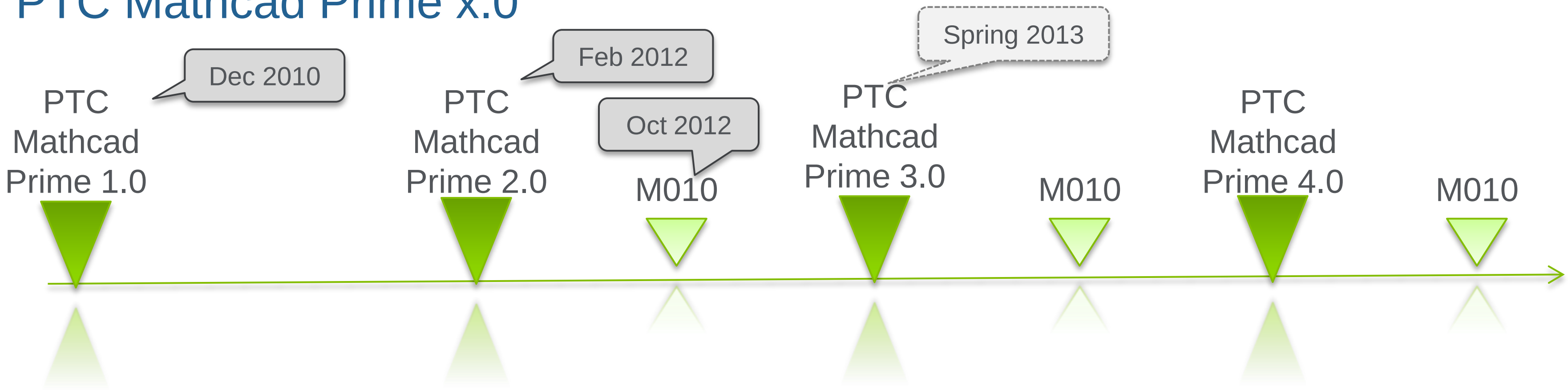
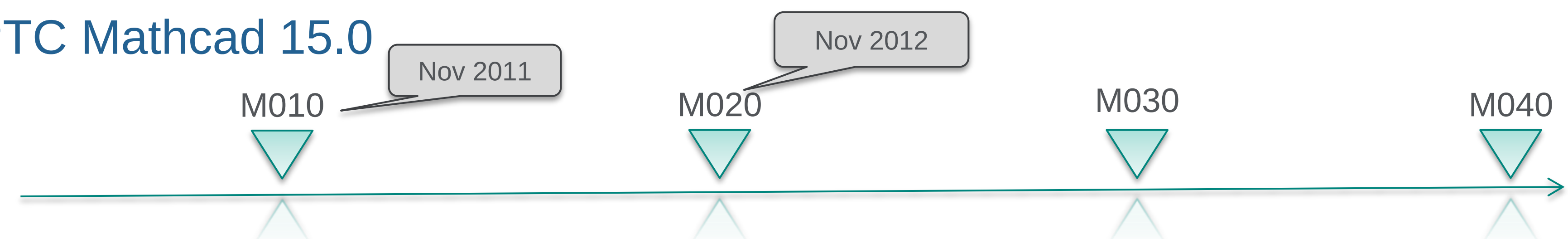


- PTC Mathcad Prime x.0



  - Yearly major releases with new functionality
  - Maintenance releases to address customer-reported issues

- PTC Mathcad 15.0



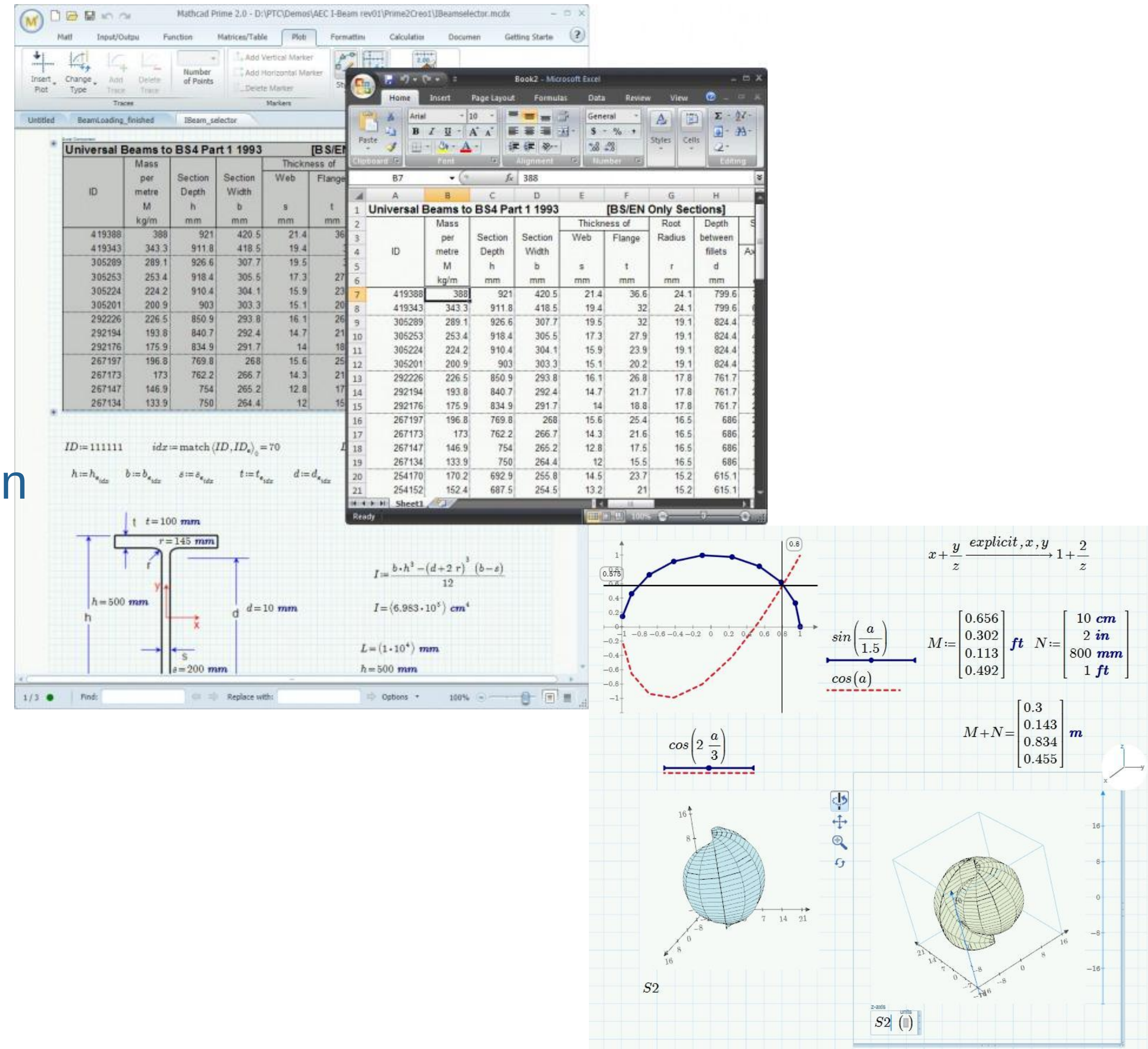
  - Maintenance releases to address customer-reported issues
  - No new features

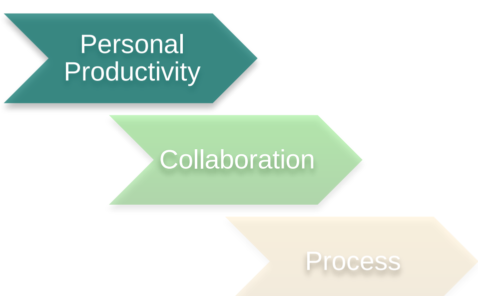
Forward looking information, subject to change without notice

Roadmap

Tools for engineers

- Integration with Excel
- Performance
- Enhanced Numerics
- Symbolics
- Document Organization





PTC Mathcad Express

PTC Mathcad Express

GET IT FREE

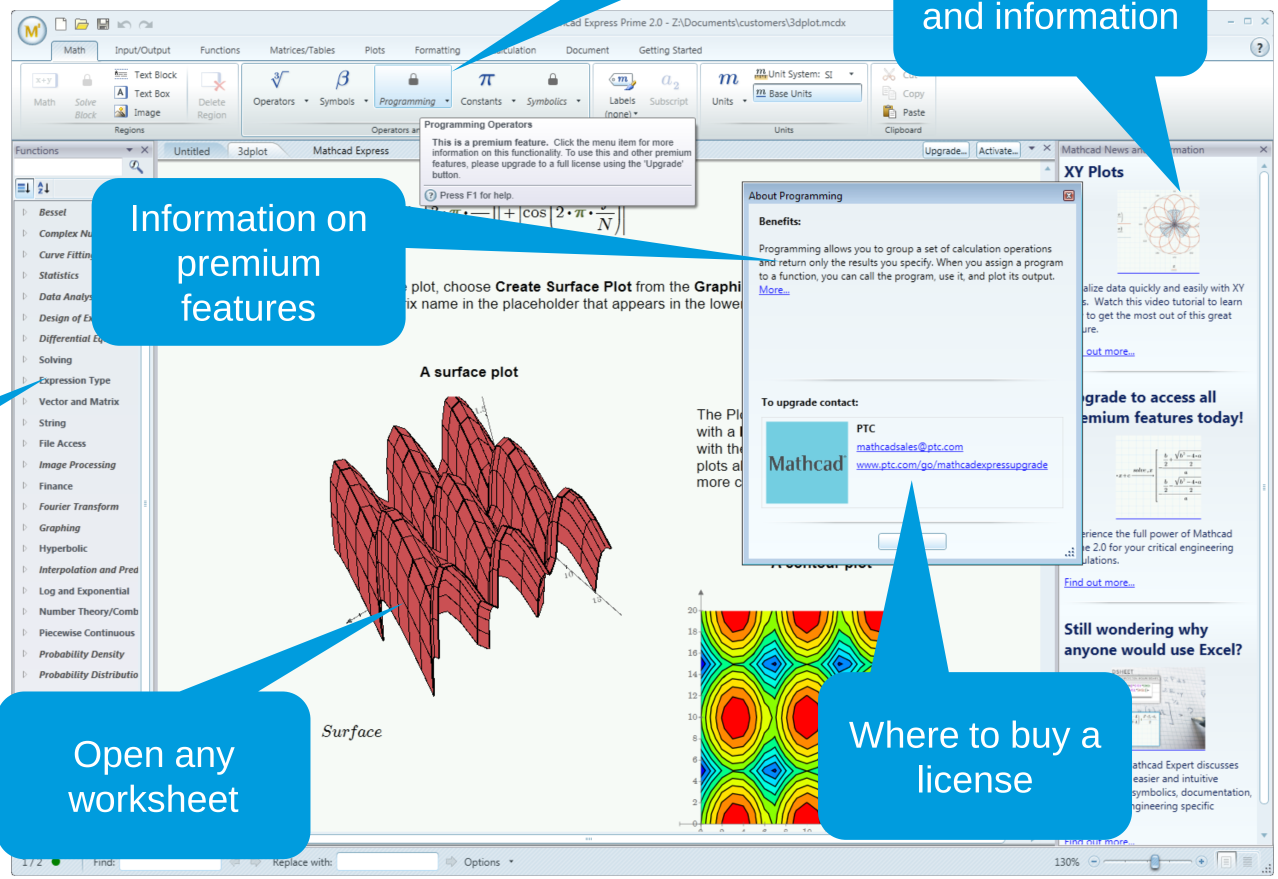
✓	Math Equation Editing
✓	Comprehensive Documentation
✓	Basic Numeric Functions and Operators
✓	Units
✓	X-Y Plots
	Advanced Numeric Functions
	Programming
	Symbolics
	Excel Integration
	Advanced Plot Types

PTC Mathcad Prime 2.0

✓	Math Equation Editing
✓	Comprehensive Documentation
✓	Basic Numeric Functions and Operators
✓	Units
✓	X-Y Plots
✓	Advanced Numeric Functions
✓	Programming
✓	Symbolics
✓	Excel Integration
✓	Advanced Plot Types

PTC Mathcad Express

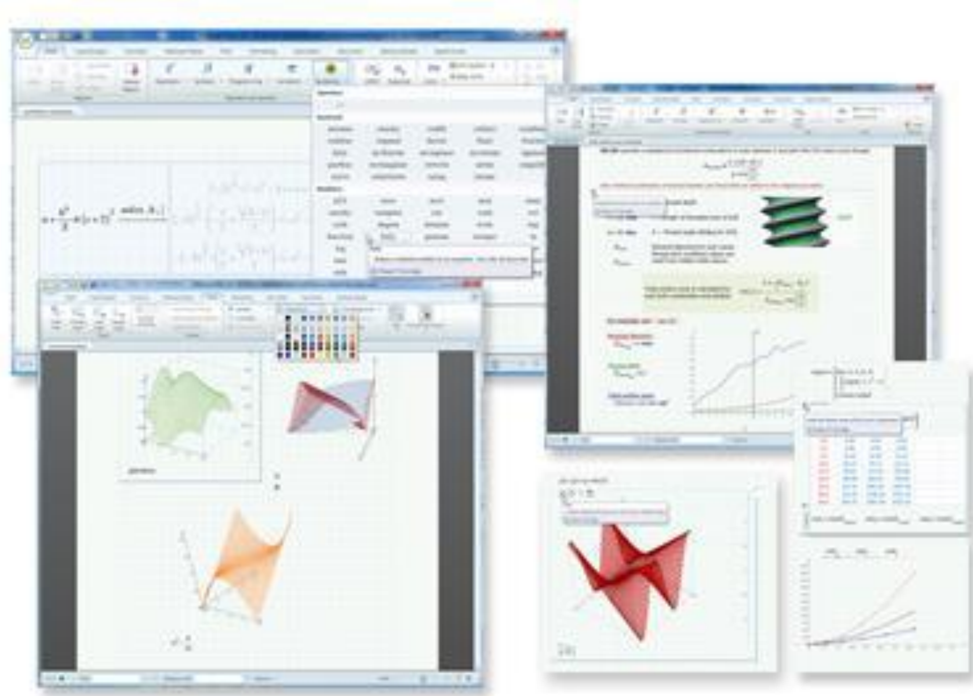
- Leveraging PTC Mathcad Express
  - Helps adoption across enterprise
  - Exchange Mathcad documents freely (use as reader)
- Benefits of upgrading
  - Advanced features
  - Maintenance
  - Standardization



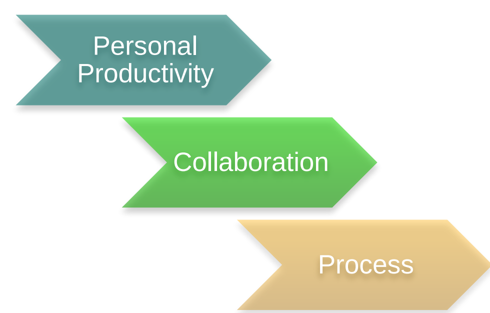
PTC Mathcad Prime 3.0

Designed to…

- Capture Knowledge
  - Enhanced document formatting
  - Better conversion fidelity
- Standardize
  - Templates
- Integrate
  - PTC Creo integration
  - Extension functions (user DLL's)
- Do more
  - Enhanced numeric functions



- Release: Spring 2013



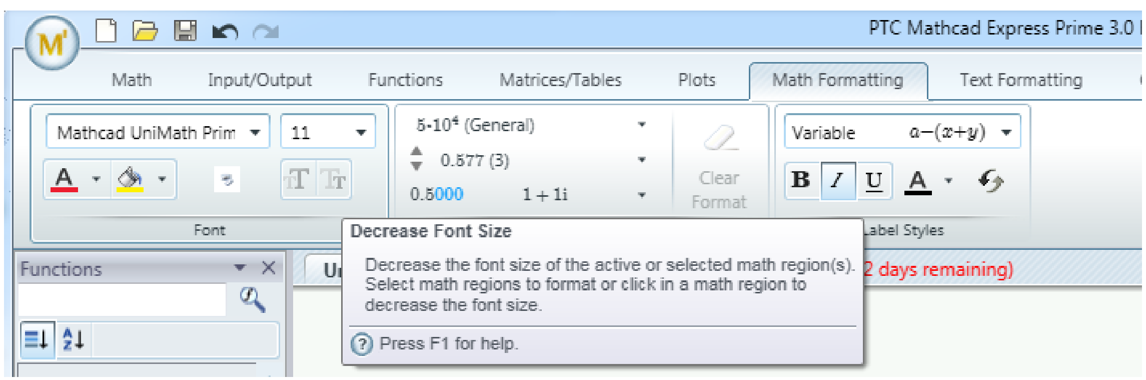
Detailed feature list

- New features
  - Templates
  - Inclusion of equations in flowing text
  - Formatting of equations (font, color, etc.)
  - Global definition operator
  - Unconstrained optimization
  - LU, QR and Cholesky decomposition functions
  - Extension functions (user DLL's) *
  - Integration with PTC Creo *

$$k \equiv 37 \frac{N}{m}$$

$$f(x) := a \cdot \sin(x)$$

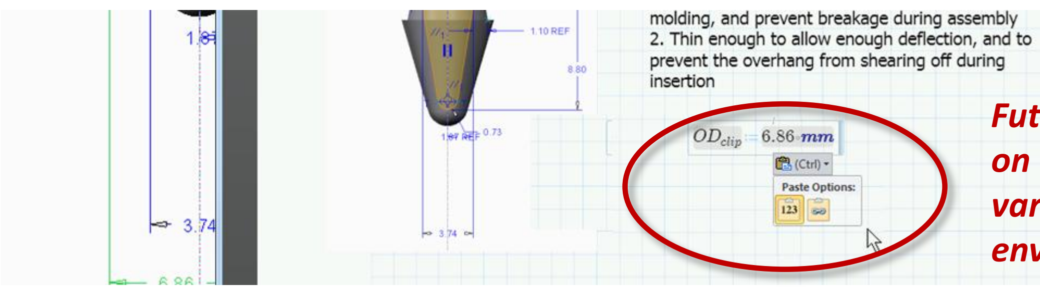
$$g(x) := b \cdot \cos(x)$$



PTC Creo Mathcad

The goal: Tie ‘why’ (PTC Mathcad) to ‘what’ (PTC Creo) data

- PTC Mathcad deployed as a PTC Creo-aware applet (e.g. like the Learning Connector)
- One (or none) embedded PTC Mathcad scratchpad per savable PTC Creo object
- Similar to an OLE object (e.g. like PTC Mathcad’s Excel component)
- PTC Creo Mathcad *is* PTC Mathcad
- PTC Creo Mathcad opens embedded scratchpads *and* external worksheets
- PTC Creo Mathcad can be started and exited independently of PTC Creo
- Awareness: PTC Mathcad indicators in PTC Creo, PTC Creo differentiators in PTC Mathcad
- Ad-hoc copy paste between PTC Creo and PTC Creo Mathcad



Future: create relationships on the fly as results or variables are pasted in either environment

- Building and maintaining parametric model integration will come!

PTC Creo Mathcad

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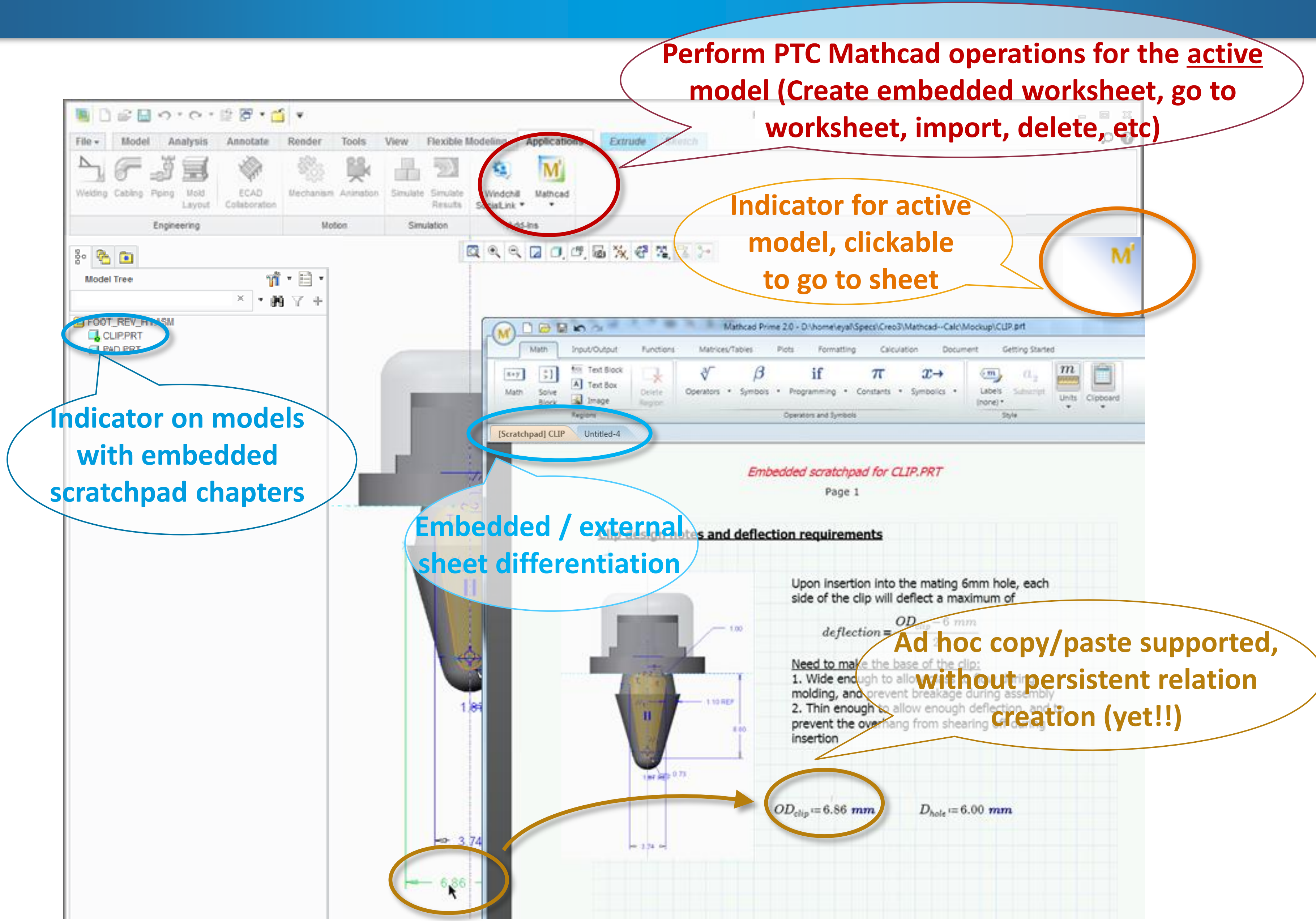

PTC Mathcad after Prime 3.0

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Designed to…

- Communicate effectively
  - Plot improvements
  - Sketching
- Standardize
  - Input controls
- Integrate
  - API
- Do more
  - Enhanced numerics
  - Better conversion fidelity

Personal Productivity → Collaboration → Process

PTC Mathcad after Prime 3.0

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Candidate detailed feature list

- New features
  - Plot layout and other improvements
  - Text styles
  - Input controls
  - Spell checker
  - API
  - Extension functions (user DLL's) *
  - Scripting
  - Sketching

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