

Excel Power Booster!

TK Solver™ Player for Excel is free software for sharing packaged Excel worksheets and mathematical models created in *TK Solver 5.0 Premium Edition*. The Player is a collaborative math engine that can be downloaded from the UTS website similar to the way Adobe Systems, Inc. distributes their reader for viewing PDF files. However, it's much more than a reader utility. Think of it as a power booster for Excel!

Once downloaded, it runs entirely behind the scenes and allows Excel users to take advantage of a wealth of powerful *TK Solver* functionality—all from a familiar Excel interface.



TK Solver™
Player for Excel

TK Solver Player for Excel — Pipe Flow Example

Input	Value	Unit	Comment	Output	Value	Unit	Comment
T	60	°F	Fluid temperature	viscosity	0.000753286	lb-ft-s	Fluid viscosity
D	3	in	Inside pipe diameter	density	62.36656913	lb-ft-3	Fluid density
eps	0.0072	in	Pipe roughness	V	7.130141451	ft/s	Linear velocity
L	240	in	Pipe length	w	21.8284392	lb/s	Weight rate of flow
q	0.35	ft ³ -s	Volumetric rate of flow	NRe	147581.7386		Reynolds number
				f	0.00641173		Friction factor
				dehdp	101.1402188	lb-ft-2	Pressure drop due to
				gradient	5.05551094	lb-ft-3	Pressure drop gradient

$$\frac{1}{f} = -4 \log \left[\frac{\text{eps}}{3.7 D} + \frac{1.255}{\text{NRe} \sqrt{f}} \right]$$

Instant MathLook view copied and pasted from the TK Solver model!

TK Solver is used to get the viscosity and density values from its NIST database of physical properties and also does the iterative calculation to determine the friction factor. Using TK Solver to handle iterative calculations frees up the Excel Solver add-in for other tasks such as optimization.

TK Solver also allows for unit conversions within this example. Click on the unit field for any variable and use the pull-down menu to make a change.

A table of pipe roughness values can be viewed by clicking the table icon on the TK Player toolbar. TK Player gives users access to any data table within the TK Solver models. Application developers can also choose to hide proprietary data.

Easy to Use

Package “recipients” can interact with the model by changing inputs and viewing the outputs, perform automatic unit conversions and iterative calculations, as well as take advantage of extensive NIST thermodynamic and transport property functions. It gives casual Excel users “power-user” capabilities and power users, unprecedented flexibility!

TK Solver Player for Excel — Differential Equations Example

Input	Value	Comment	Output	Value	Comment
A	0.5	Equation constant, A	y1t	5.492597478	y1 solution at t
B	1.5	Equation constant, B	y2t	5.399140505	y2 solution at t
C	6	Equation constant, C			
D	4	Equation constant, D			
ti	0	Initial t value			
y1i	3	Initial condition, y1 at ti			
y2i	-7	Initial condition, y2 at ti			
tmax	1	Maximum t for integration			
	0.85	Sample value, t			

TK Solver is used to solve two coupled differential equations. The equation parameters and initial conditions are supplied at left and the solutions “at t” are shown above. The plot below shows the solutions graphically. A table is also available via the toolbar icon.

Plots:

$$y1' = A*y1 + B*y2$$

$$y2' = C*y1 + D*y2$$

New TK Solver 5.0 Premium Edition Features

It's all part of a brand new feature set in the industry's most powerful math modeling system that allows *TK Solver* users to dynamically link any number of mathematical models to an Excel spreadsheet and “package” the file. The new packaging feature automatically converts the file into a mini-application that can be shared with anyone, anywhere via the *TK Solver Player*. Files can be saved as .exe, .zip, or .tkx files for secure transport. Although totally interactive, the original formulas and models remain “protected” and the recipient is not able to view or change them. It's fast, easy, and efficient!

TK Solver is the platform and calculation engine that powers a number of UTS applications including the *Integrated Gear Software (IGS)* suite of industry-standard gear design and manufacturing software and the world-renowned *Interactive Roark's Formulas* for computerized structural analysis. To test drive *TK Solver* or for more information on UTS products and custom development services visit us on the web at www.uts.us.com.

About Universal Technical Systems, Inc.

Universal Technical Systems, Inc., established in 1984, is the leading provider of high-productivity problem-solving software products and custom developed solutions. With headquarters in Rockford, Illinois and subsidiaries in the UK and India, UTS serves customers worldwide. For over twenty years UTS has focused exclusively on providing solutions that help companies in the scientific, engineering, operations research and management, and financial communities simplify complex calculations and streamline the processes that drive their businesses. UTS products and custom solutions are available for desktop and web use.

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