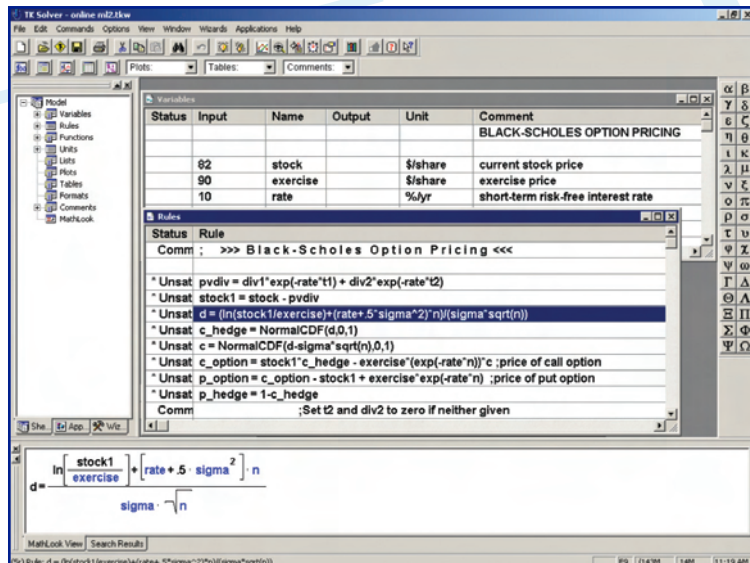# TK Solver

Math and So Much More

TK Solver™ 5.0 from Universal Technical Systems, Inc. (UTS) is one of the longest–standing mathematical equation solvers on the market today. Built on proven technology, TK Solver readily solves simultaneous equations using iteration to significantly reduce design hours, production costs, and speed time to market.

Simple and Fast

Engineers, scientists, and financial analysts need to approach problems from many different angles and TK Solver enables them do this up to 90% faster than traditional methods. What makes this possible is the unique rule–based, declarative method of setting up problems. Other analysis and programming environments use a procedural approach that requires a precise sequence of instructions and formulas where the known and unknown variables are sorted out ahead of time.
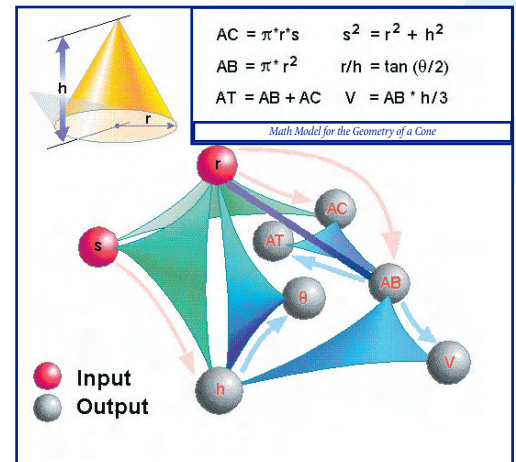

Not so with TK Solver. You don't need to decide what variables will be inputs and which ones will be outputs when creating a mathematical model. This unique capability completely eliminates tedious "busy work" allowing you to accomplish more in less time. Powerful technology at an affordable price, that's TK Solver.

Think of what that means for designing springs and gears or for studying how variables such as loads, pressure, heat, or even loan calculations behave as other inputs change. Setting up problems is fast and easy with TK Solver.

Multi–directional

Additionally, TK Solver is still the only solution that gives you the ability to use guess values to "backsolve" making it the ideal tool for testing "what if" scenarios. Imagine being able to solve for anything, in any direction, and reverse engineer a solution without having to rewrite the equations. TK Solver can handle 1,000's of simultaneous linear and non–linear equations so you no longer have to build matrices or make trial and error calculations. Just give TK Solver your best guess and it will use the built–in iterative solver to find the answer.

$$AC = \pi^* r^* s \qquad s^2 = r^2 + h^2$$
$$AB = \pi^* r^2 \qquad r/h = \tan(\theta/2)$$
$$AT = AB + AC \qquad V = AB^* h / 3$$

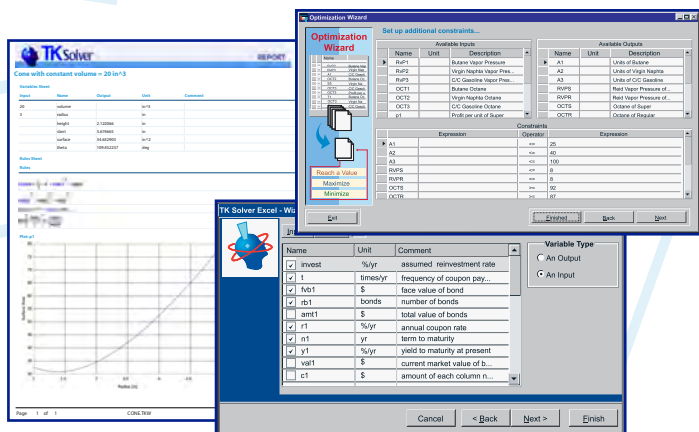*Math Model for the Geometry of a Cone*

Input
Output

TK Solver is also ideal for building enterprise applications and the good news is—you don't have to be an "expert" to use it. Seamless integration with Microsoft® Excel enables TK Solver to operate as a macro language with VBA—dramatically reducing application development time—and readily integrates with standard databases and well as computer aided design systems. There's no limit to what TK Solver can do!

TK Solver allows you to concentrate on the principles of the subject instead of the algebraic manipulations or the syntax of the programming code.

Bottom line: TK Solver focuses on the math, so you can focus on your business. Imagine that!

TK Solver At a Glance

- Instant MathLook—displays a two–dimensional rendering of formulas as if written by hand making it easy to audit equations

- Solution Tracer—tracks and documents every detail of a solution for unprecedented control

- Dynamic Plot Annotations—displays highly detailed and customizable data analysis and visualization

- Report Wizard—delivers on-demand custom reports that can be saved in Adobe® Acrobat PDF or RTF formats

- Excel Link—seamlessly integrates with MS Excel and operates as a macro language with VBA for fast and easy application development

- Tutorials—interactive and convenient online guides to help you get the most out of TK Solver

Knowledge is Power

TK Solver includes more than 200 built–in functions that do everything from trigonometry and integration, to differentiation, matrix operations, and simulations.

Also included, is a collection of thermodynamic and transport property functions based on the *NIST Standard Reference Database 23* with more than thirty functions involving temperature, pressure, density, entropy, enthalpy, and more. There are over one hundred fluids and mixtures plus a utility to create new mixtures that supports English, Metric, Mass, and Molar unit combinations.

TK Solver makes model sharing easier with a wide range of units for engineering and science that makes unit conversion automatic. No more paging through handbooks to find the right formula and unlike a scratch pad or symbolic math program, there's no complicated interface or dependence on math notation. With TK Solver, the information you need is simply a mouse click away.
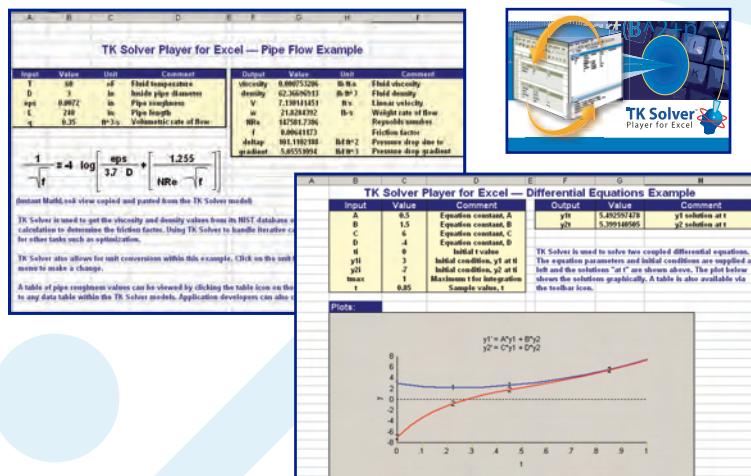
TK Solver Premium Edition Features

TK Solver–Excel Link Packager for Distribution lets you dynamically link any number of math models to an excel worksheet and "package" the file. The Packager automatically converts the file into a mini-application (.exe, .zip, or .tkx file extension) that can be distributed and shared with anyone, anywhere via the TK Solver Player for Excel.

The Player is a collaborative math engine available as a FREE download from the UTS web site 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. 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. Although totally interactive, the original formulas and models remain "protected" and the recipient is not able to change them. It's fast, easy, and efficient!

The TK Solver Solution Optimizer is another premium edition feature that provides easy–to–use, advanced control over constraints and bounds and requires no additional programming. The Optimization Wizard gives you unprecedented flexibility by allowing you to perform sophisticated scenarios to achieve precise design specifications—faster than ever before. You'll be able to take your design process to a whole new level with the TK Solver Solution Optimizer!

TK Solver is available in a Web, Standard, and Premium Edition and supports MS Windows 2000 and Windows XP platforms.