

For Immediate Release

Saltire Software Announces Mathematical Design Capture Tool

20 year research project at Saltire Software results in *Mechanical Expressions*, a radically new type of mathematical modeling software with the potential to transform STEM education and redefine early stage design.

Tigard, OR—11/18/13—*Mechanical Expressions* is a mathematical design capture tool which converts mechanical models into explicit mathematics. While there are many engineering analysis packages which can create and solve numerical models of mechanical systems, *Mechanical Expressions* is the first system which creates symbolic mathematical models.

During the conceptual phase of design, a simple symbolic model can capture the dependence of critical performance measures on design parameters. The availability of such a model as mathematics lets the engineer deploy the full range and variety of analysis methods available in CAS, graphing and numerical analysis packages.

Says Philip Todd, founder and president of Saltire Software: "Instead of using the black box approach, which only gives you the numeric response for specific input values, *Mechanical Expressions* gives you the mathematics of the whole design."

For example, in modelling a piston-crank, a user would create a simplified skeleton diagram with variables assigned to the crank radius, the connecting rod length and the crank angle. He could then ask for the mathematical expression for the output torque as a function of these parameters. This expression captures the torque, not just for a single crank-slider, but for an entire continuum of possible crank-sliders.

"It is the ability to capture the essence, not just of a single instance of a design but an entire design space, that makes *Mechanical Expressions* such a powerful and exciting tool," Todd explains.

Mechanical Expressions can output mathematics in the native form of all prominent Computer Algebra Systems for analysis, as Tex or MathML for display and as source code in 9 different computer languages for incorporation in programs and scripts.

In education, routine mathematical manipulations are still the mainstay of core STEM curriculum. As the curriculum adapts to the presence of technology, students will do less manipulation and more modeling. This is where *Mechanical Expressions* stands out.

Mechanical Expressions is the culmination of a remarkable 20 year research effort at Saltire Software to automate the mathematical modeling process. This effort has been supported by the National Science Foundation through grants from the Small Business Innovative Research Program.

“Our early prototypes in the 1990’s were promising but too slow. The steady increase in computer speed, and particularly in memory between 1996 and 2006 transformed what was once just a curiosity into a practical application,” says Todd.

In 2006, Saltire broke new ground by releasing a symbolic geometry product: *Geometry Expressions*. This is a valuable mathematical modelling tool for problems which can be expressed as pure geometry. *Mechanical Expressions* is a natural extension of that technology to the realm of engineering mechanics.

Mechanical Expressions is currently in beta, with release scheduled for Q1 2014.

For more information about the product and the beta, visit <http://www.mechanicalexpressions.com/>

For more information on other Saltire Software products, visit <http://www.saltire.com/>

About Saltire Software:

Based in Tigard OR, Saltire Software was founded in 1989 as a spin off from Tektronix Laboratories. Its flagship product, the mechanism design package Analytix, has been on the market for over 20 years and recently underwent a significant overhaul. Saltire has built a strong reputation for innovative software in the mathematics education field, highlighting the important connection between geometry and algebra. The company has contributed its expertise to advanced calculators from all the major manufacturers.

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Note to the editor: High resolution pictures for this article can be downloaded at http://www.saltire.com/press_materials.html

