

# Documenting Design Calculations with Mathcad

**A free seminar that will show you how New Zealand's leading engineering companies are ensuring their calculations are reliable and re-usable**

In any engineering development there is more potential for cost saving at the design stage than at any other. Only by having clear, auditable and powerful design tools can you maximise these savings.

This seminar shows you how Mathcad enables you not only to perform numerical and algebraic calculations, but to document the process behind them, from requirements, to methods and assumptions and links to the critical data.

As well as explaining the importance of documenting the calculations, this seminar will demonstrate the tools available for you to use, from simple numerical calculations to more advanced symbolic mathematics and equation solving.

Come and see why leading New Zealand engineering companies are promoting the use of Mathcad in their organisations

## About Mathcad

Mathcad is a system for creating mathematical documents that read like a page in a textbook, yet give you access to far more computing power than in any spreadsheet.

You can do numerical mathematics, symbolic mathematics, solving, calculus, and two- or three-dimensional graphing. A simple-to-use programming language is available when the large number of built-in functions don't meet your particular need. Mathcad's graphs let you view your expressions or data quickly to check for errors and to get more understanding.

Many people find that being able to include dimensional units in their calculations helps them to avoid simple errors, and makes checking of calculations much easier. Others appreciate the combination of text, formulas and graphs in a single document, which makes it easy to verify the whole document from a printed copy.

Mathcad should be considered any time you have to perform calculations more complex than summarising rows and columns of numbers. You know how easy it is to get the wrong answer when you use a spreadsheet – all it takes is an incorrect expression, mistyping, misunderstanding, incorrect units or a myriad of other things. When you get it right, it has often taken you far longer than expected. Mathcad removes a lot of these problems.

## Do symbolic and matrix mathematics

The screenshot displays the Mathcad Professional interface with several examples of mathematical work:

- Symbolic transformation:** A complex expression involving trigonometric and logarithmic functions is shown being simplified.
- Mixed arrays of text and numbers:** A matrix  $M$  is defined with text elements and numerical values:  $M = \begin{pmatrix} \text{"Year"} & \text{"Count"} \\ 1.7 \times 10^3 & 5 \\ 1.701 \times 10^3 & 11 \end{pmatrix}$ .
- Definition of a series expression:** A summation formula  $x_n = \sum_{k=0}^{N-1} C_k e^{j \cdot k \cdot 2 \cdot \pi \cdot \frac{n}{N}}$  is shown with a note that  $j = \sqrt{-1}$  and the index counter  $n$  ranges from 0 to  $N-1$ .
- Palettes:** The software's tool palettes for calculations and programming are visible at the bottom.
- 3D Graph:** A 3D surface plot is displayed, representing a graph of an array of numbers.

## Who should attend?

- Senior Engineer
- Mechanical Engineer
- Electrical Engineer
- Electronic Engineer
- Civil Engineer
- Physicist
- Designer
- Estimator
- Scientist

## Seminar Highlights

- Entering mathematical expressions, using the notation you learned at school and see in textbooks or journals.
- All the calculus, algebra and trigonometry you learned at school (and a lot you did not) is immediately available to you.
- Solving systems of mathematical equations
- Mathcad cooperates with Excel, CAD programs and other common packages.
- The importance of calculation management.
- Tools for calculation management

# mathcad

## Locations and times

All seminars start at 1pm and last about 90 minutes

### Wellington

Wednesday, 4 May 2005 Copthorne Plimmer Towers Hotel

### Dunedin

Thursday, 5 May 2005 Cargills Hotel

### Christchurch

Friday, 6 May 2005 Heritage Hotel

### Auckland

Wednesday, 11 May 2005 Crowne Plaza Hotel

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