



# Bodie Technology, Inc

## Smart-Tools for Analysis™

www.BodieTech.com

### 3 Day Training Course

## Introduction to Kornucopia® and Mathcad®

*Want a faster, more powerful, and efficient alternative to analyze data, perform calculations, document and reuse your work?*

#### Attend this course if you work with

- Simulation tools like FEA, CFD, or others
- Data from experiments and/or simulations
- Closed-form & pseudo-analytical methods

“Without Kornucopia® I really doubt the quality and quantity of work would have been what it was. The 1 on 1 instruction was invaluable.”

**Lieutenant Colonel Kelly Laughlin, PhD**  
- US Army, Picatinny Arsenal

#### You will learn

1. The basics and enhanced functionality of Kornucopia® and Mathcad®
  - Equations, arrays and strings, units, plotting, Mathcad® programming, numerous Kornucopia® functions & features, and more!
2. How to process a variety of datasets from experiments & simulations:
  - Read/write ASCII data in various formats, including headers & comments
  - Clean, heal, reorder, trim, tweak, smooth, & average data curves
  - Work with nested arrays to easily manipulate multiple datasets
  - Easily perform Fourier Analysis, smooth, integrate, and differentiate data
  - Interact with Excel & make effective PowerPoint graphs from Mathcad® plots

Learn how to effectively work with your data!

The screenshot shows a Mathcad worksheet with the following content:

- Code:**

```

dataA = readASCII_k("data\multiSpecimens_MTS.txt", "comma", **)
summary_k(dataA, **) = (2774.6)

TIME = row DISP = col AREA = cm2 LOAD = gf

dataA = unpack_k(dataA, (1) "BeginData", (2) "EndData", **)

summary_k(dataA, **) = (440.6)
                    (397.6)
                    (360.6)
                    (422.6)
                    (400.6)

phiA = nestPlot_k(dataA, **)

```
- Plot 1:** "Raw Load vs. Disp" showing Load (gf) vs. Disp (m) with a blue curve and red vertical markers.
- Code:**

```

Clean data and convert to Stress vs. Strain
hea1 = trim(trim_k(dataA_1, dataA_1), 1000, "max", **)
tmp = treshoXY_k("start", tmp, 2, 0, 0.05, ("excess": 3))
shaftData_k(tmp, "start", 0, **)

T = ** T1 = (hea1) LOAD / A0 ε = ** ε1 = (hea1) DISP / L0
εT = ** εT1 = augment(ε1, T1)
ave = averageXY_k(εT, "x", "norm": yes) phi = nestPlot_k(εT, **)

```
- Plot 2:** "Stress vs Strain" showing Stress (MPa) vs. Strain (%) with a red curve and a green checkmark.

# Introduction to Kornucopia® and Mathcad®

Bodie Technology, Inc  
Smart-Tools for Analysis™  
www.BodieTech.com



## Course Outline

Can be customized to meet your needs

### Day 1 - Basics of Mathcad®

- What's possible with Mathcad® & Kornucopia®
  - Symbolics, numerical methods, data analysis, ...
  - Analyzing challenging data
- Mathcad® basics
  - Worksheet layout and calculation order
  - Creating/editing math, graph, & text regions
  - Referenced worksheets and collapsed areas
- Working with units
  - In equations, plots, arrays, and data files
- Creating your first worksheets
  - Some simple calculations
  - Working with ASCII data files

### Day 2 - Kornucopia® (Part 1)

- Arrays, range variables, and looping
  - Matrices, 2-D arrays, and nested arrays
  - Various ways to loop equations and functions
- Reading and writing data files
- Tips on using solve-blocks
- Easy-to-use programming within Mathcad®
  - *NO need to be a C or Scripting wizard!*

### Day 2 Continued

- Kornucopia® features for analyzing challenging data
  - Functions & example worksheets
  - The ADV parameter
  - Accessing help and documentation
  - Connecting to the Kornucopia® library
- Enhanced file reading & writing
  - Working with “real-world” ASCII files with header text, stacked datasets, etc.
  - Unpacking data files

### Day 3 - Kornucopia® (Part 2)

- Array and string manipulation
  - Reorder rows & cols, nested array tools, find locations in data that meet criteria, string manipulation & parsing
- Techniques for easily plotting multiple curves
- Data adjusting
  - Trim, shift, tweak, average, and rescale
- Easy-to-use DSP (Digital Signal Processing)
  - Data regularization, Fourier analysis & filtering
  - Easy-to-use data smoothing
- Integration and derivatives for arrays of data
- Misc. functions: Message box popup, arc length, ...
- Improving user friendliness of worksheets
- Working with Excel and PowerPoint

Course Inquiries: [info@BodieTech.com](mailto:info@BodieTech.com)

Copyright © 2004 - 2010  
Bodie Technology, Inc.