



# Kornucopia<sup>®</sup> ML<sup>™</sup> for use with MATLAB<sup>®</sup>

Faster Data Analysis with Greater Understanding<sup>™</sup>

Kornucopia saves time and improves analysis effectiveness for experimental, testing, research and simulation professionals.

Work with **all** your data, not just the numbers

	1	2	3
1	0	0	0
2	0.0496	0.4140	0.0481
3	0.0991	0.8249	0.0962
4	0.1487	1.2329	0.1443
5	0.1982	1.6379	0.1925
6	0.2478	2.0398	0.2406
7	0.2974	2.4388	0.2887

With numbers only:

- Column names?
- What are the units?
- Overall description?

**Kornucopia<sup>®</sup> ML<sup>™</sup> allows you to calculate with it all!**

The screenshot shows the MATLAB R2015b environment. The Editor window displays the following code:

```

196 display(test)
197 Area = 4*mil * 0.5*in;
198 L = 0.5*ft;
199 ss = [test('Ext')/L, test('Load')/Area];
200 ss.Props.ColNames = 'Strain, Stress';
201 ss('Strain') = ss('Strain').convert('%');
202 Work = k_integrate(ss('Strain'), ss('Stress'))
203 Wmax = max(Work);
204 k_plot(ss)
205 k_displayOnFigure(0.3, 0.5, Wmax)
  
```

The Command Window shows the output of the script:

```

test =
tensionTest.csv
=====
      Time      Load      Ext      Vel
      [s]       [N]       [mm]    [mm/s]
-----
      0          0          0      0.97082
0.049559  0.41396  0.048113  0.97082
0.099117  0.82492  0.096225  0.97082
0.14868   1.2329   0.14434   0.97082
... 881 rows not shown.
See up to "n" rows via k_set('dispBrief', n).
fx >>
  
```

The Figure 6 window displays a plot titled "Stress vs. Strain". The y-axis is labeled "Stress [MPa]" and ranges from 0 to 30. The x-axis is labeled "Strain [%]" and ranges from 0 to 30. The plot shows a blue curve representing the stress-strain relationship. A text annotation on the plot indicates "Wmax = 1154.1 \* N\*mm".

## Faster, easier data manipulation and calculation with intelligent units and label handling

- Powered by an advanced Units Engine, Kornucopia's enhanced tabular data type, *k\_units*, efficiently stores numbers, associated units, column labels, and other information in a single variable that works naturally in MATLAB calculations.
- Artificial Intelligence built into Kornucopia automatically handles all required units checking/conversions, including calculations involving mixed units. With over 175 units in the extendable library, you obtain worry free calculations. Kornucopia also provides user friendly corrective assistance when units related issues occur.
- The new *k\_units* variable type provides the flexibility to perform calculations referencing columns and rows by label or traditional index number, making your MATLAB code easier to develop and follow. Kornucopia manages associated variable labeling throughout your computational work-flow. This saves time and avoids constant detaching and reattaching of descriptive labeling and other information.

## Easily read files from a variety of sources, loading all their content, not just the numbers

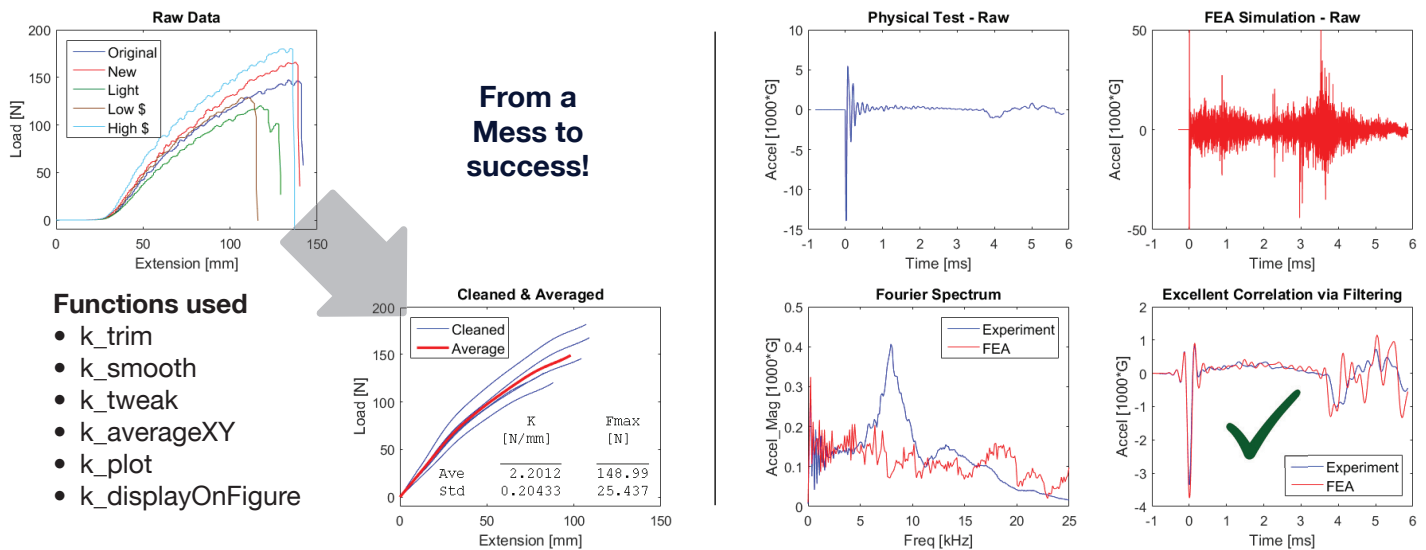
- Read input files from several formats: text, Abaqus ODB/RPT, etc. Kornucopia semi-automatically parses all the input information, converting it into a *k\_units* table with numbers, units and other information, providing speed and accuracy.

## Manage large amounts of data easily

- The efficient and flexible *k\_units* data type coupled with semi-automatic parsing during file import means more effective access to files in large directory trees, including mining historic files that have different content formats. No more data omitted because it is too time consuming or hard to manage, with Kornucopia, you can utilize ALL your data!

# Kornucopia<sup>®</sup> ML<sup>™</sup> in action with Real World Data

Extract More Value from Your Data with Over 90 Units-Smart Functions



## Automatic plot labeling – Easily create presentation ready figures

- Kornucopia's plotting is easy and fast. It incorporates the descriptive labeling and units that are already connected to the numeric data. This allows automatic labeling of the plot's axes, titles, and legend. This functionality is highly flexible with options to quickly modify the mapping of variable labels to plotting labels as desired.
- Additional plot-related functionality makes it easy to place tables and other descriptive information on figures. Kornucopia's highly automated plotting saves time and reduces errors, especially with repetitive analyses.

## Quickly clean messy real-world data

- Automated tools for fixing and cleaning nonlinear data sets: regularizing, trimming, tweaking, extending, smoothing, and curve averaging. Turn messy raw data curves into clean accurate data sets for better knowledge capture and additional use. Kornucopia easily calculates derivatives and integrals while returning the proper units for the calculation.

## Extensive Digital Signal Processing tools for noisy transient data analysis

- Enhanced filtering is provided by robust cascaded filtering methodology. Automatic algorithms reduce commonly seen filter-induced distortions at signal start and end when filtering data from simulations and physical tests. Kornucopia's help system and templates aid in selecting the right approach for the analysis of noisy data.
- Easily calculate spectra (DFS, FFT, PSD), including windowing, with a single function call that also handles the Units. Effortlessly define and apply single or bi-directional filters such as Butterworth, Cheby1, FIR, lowpass, highpass, etc.
- Perform Shock Response Analysis on transient acceleration data using Absolute Acceleration SRS and PVSS methods as well as others. Quickly estimate the benefits of including shock isolation with a ready-made Kornucopia template.

## A teaching help system with extensive examples and templates

- The help system is extensively documented for each function and fully integrated with Kornucopia's features and examples. Each function has a dedicated help page to describe how to use it and under what conditions it is most beneficial. Examples in Kornucopia's HTML based help system can be copied, modified, and used as working MATLAB templates. The help system explains underlying concepts and advanced problem solving techniques to enhance knowledge and understanding.

Explore the full Kornucopia help system at [www.BodieTech.com/kornucopia](http://www.BodieTech.com/kornucopia) or contact us at [info@BodieTech.com](mailto:info@BodieTech.com)