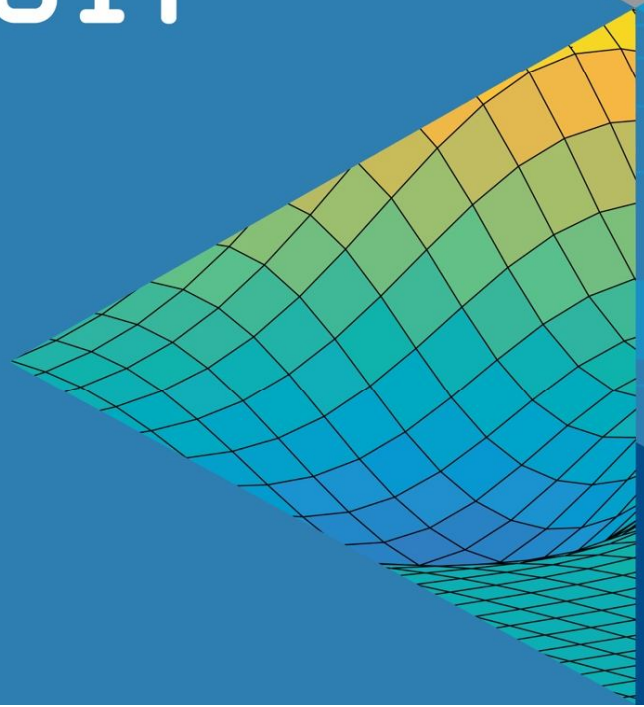
MATLAB EXPO 2017

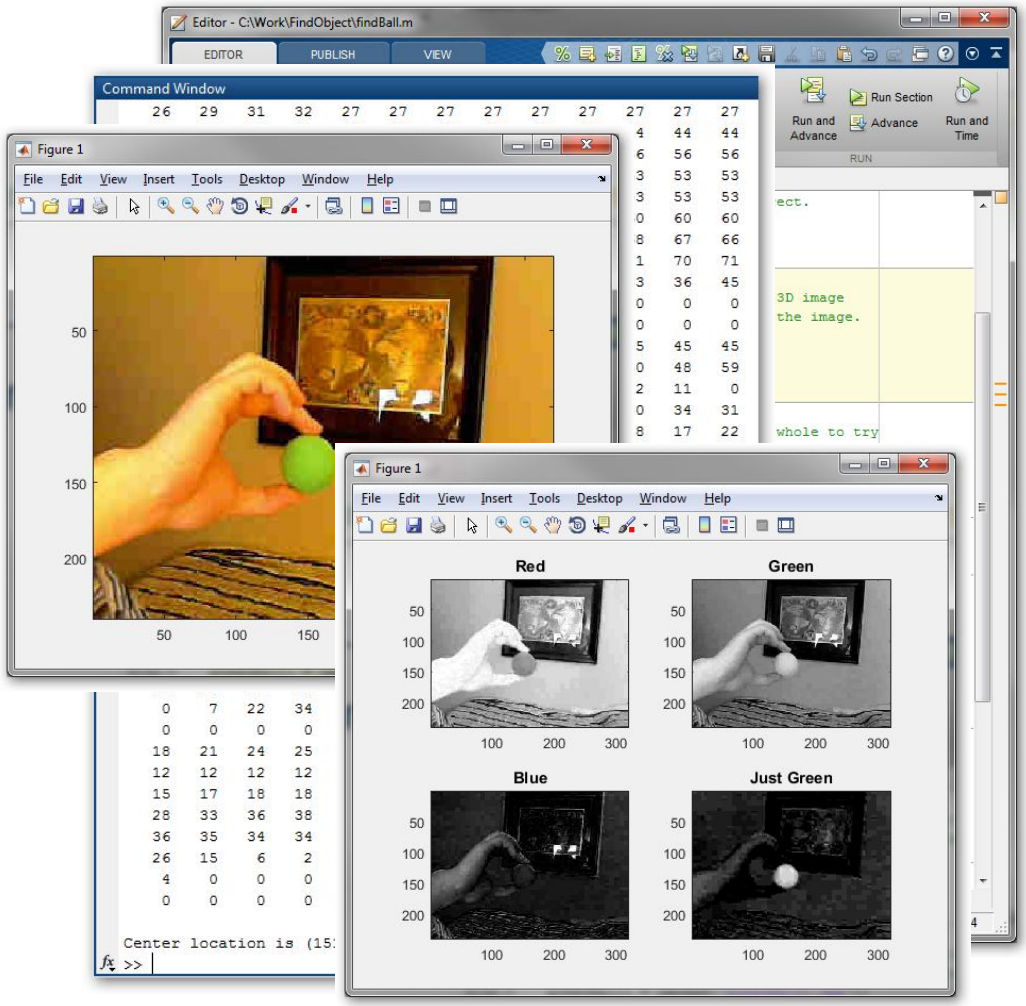
Teaching with the MATLAB Live Editor

Dr. Oliver Kluge



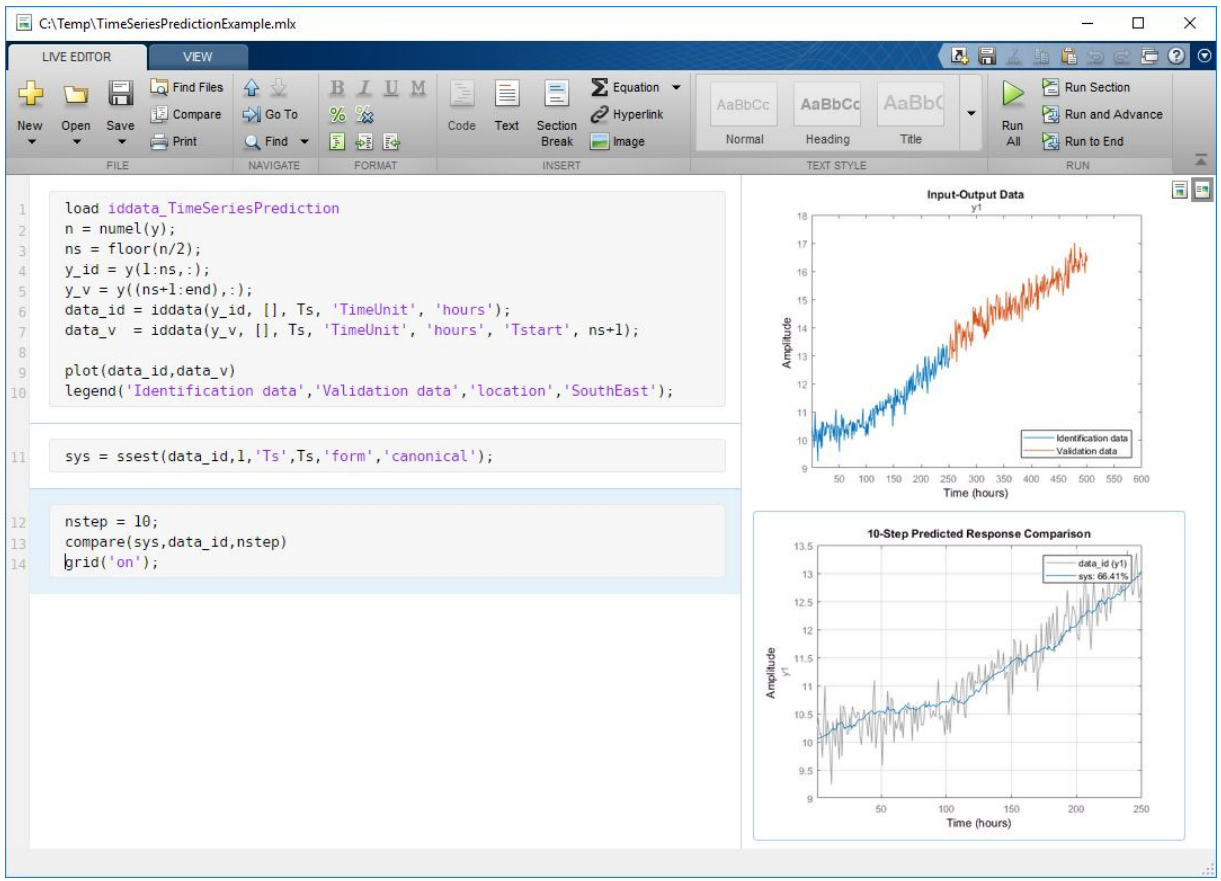
Editing and Running MATLAB Code without the MATLAB Live Editor

- Plain-text editing
- Output goes to Command Window
- Multiple figure windows appear
- Equations, images, and hyperlinks only appear if published



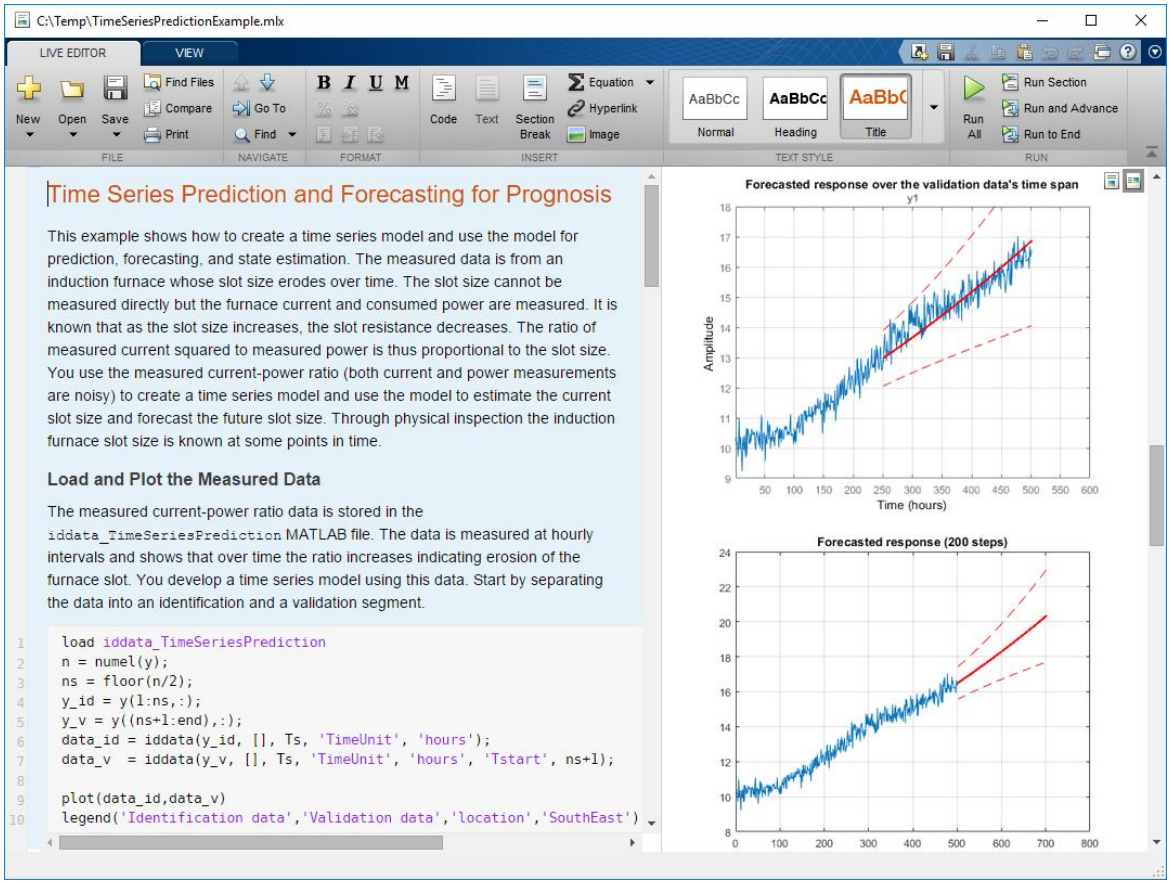
MATLAB Live Editor

The Live Editor provides a new way to create, edit and run MATLAB scripts.



MATLAB Live Editor

Turn script into an Interactive Narrative for Exploratory Learning and for Teaching.



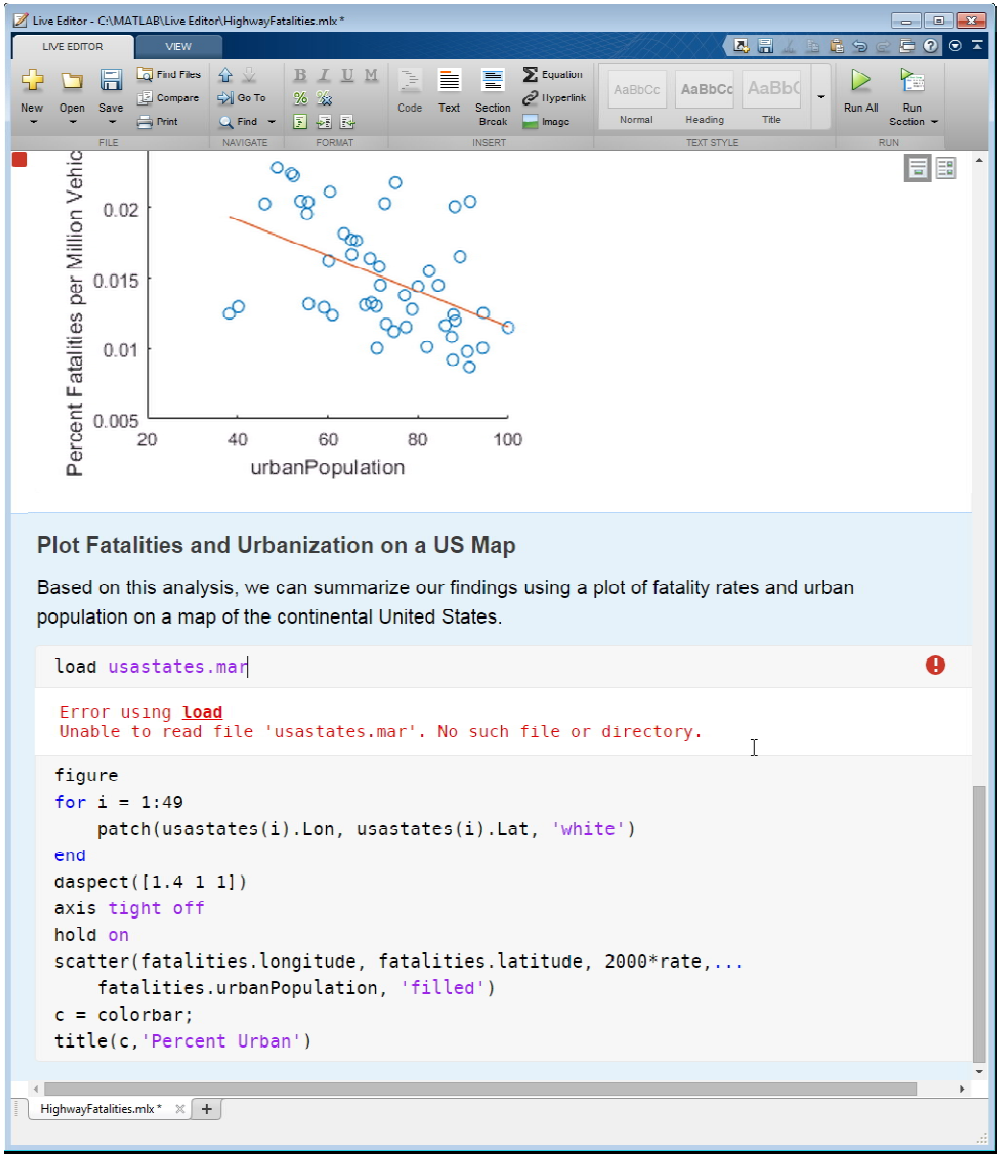
Live Editor – Areas of Application

- Exploratory Programming and Learning
- Create an Interactive Narrative
- Teach with Live Scripts

Live Editor

Exploratory Programming and Learning

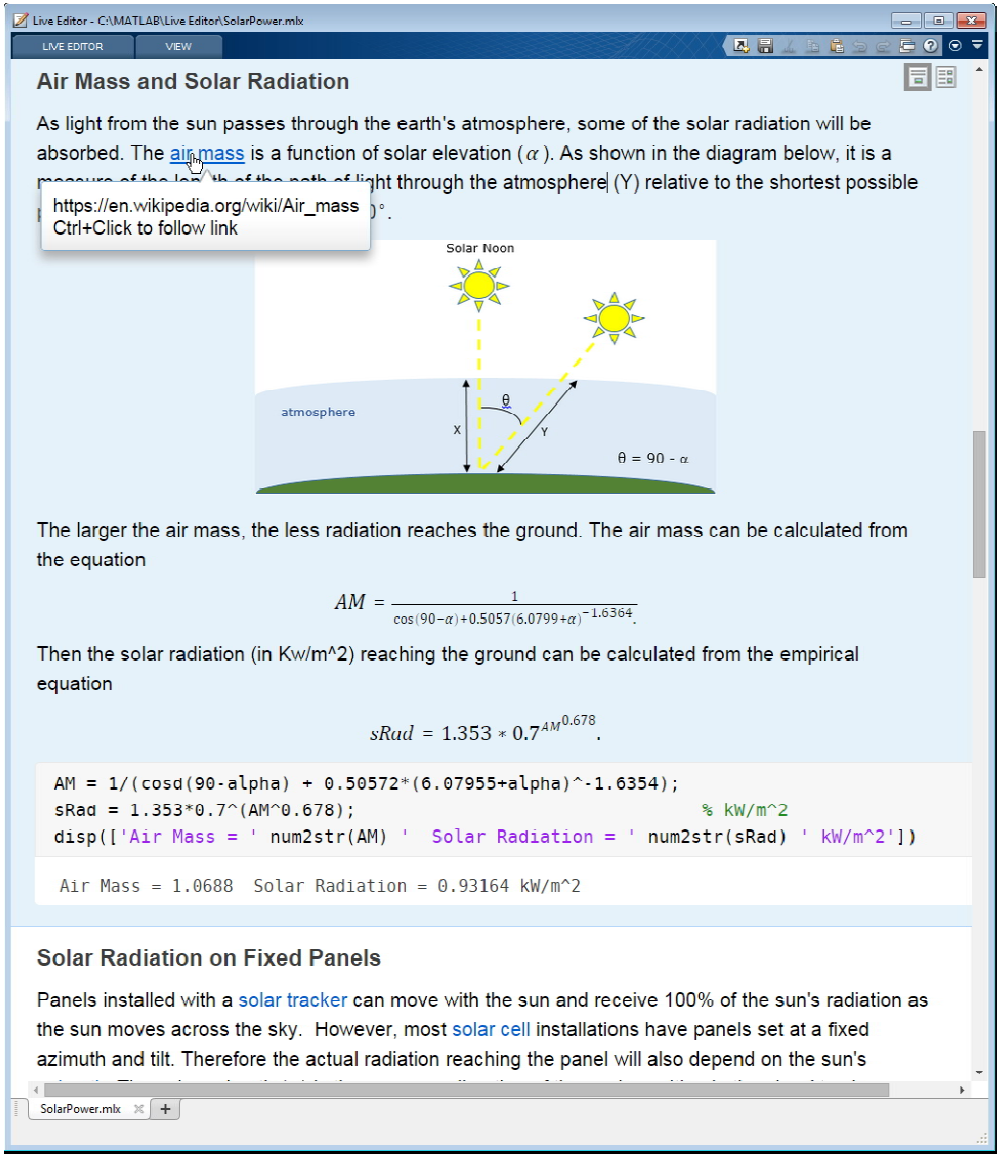
- Write, execute, and test code in a single interactive environment
- Generate results and graphics alongside the code that produced them
- Run blocks of code individually or run the whole file
- Find errors at the location in the file where they occur



Live Editor

Create an Interactive Narrative

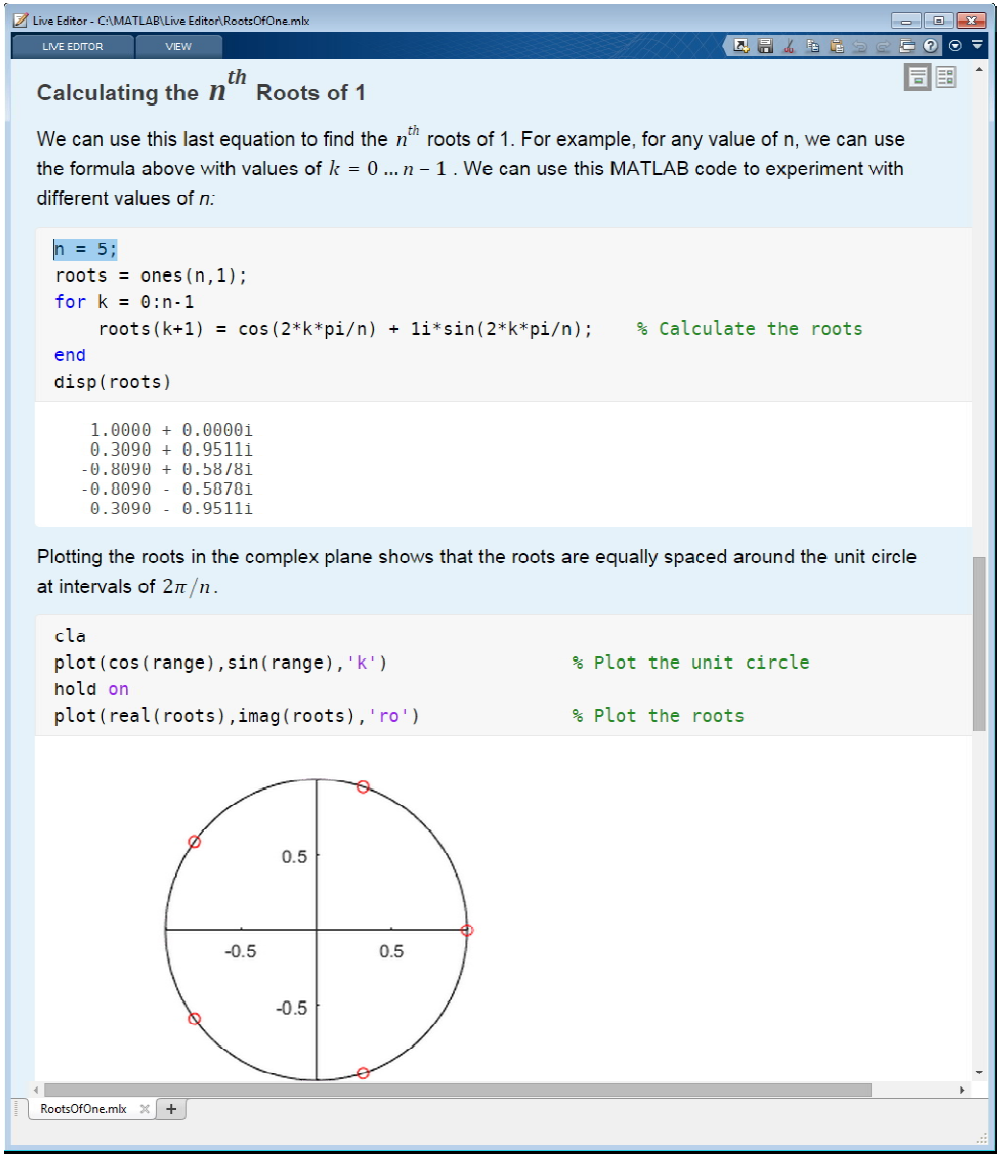
- Add titles, headings, and formatted text
- Include equations
- Add images, and hyperlinks as background material
- Save your narrative with code, results, images, and text in a single file
- Others can use your narrative to validate and extend your results
- Convert interactive documents to HTML or PDF for publication



Live Editor

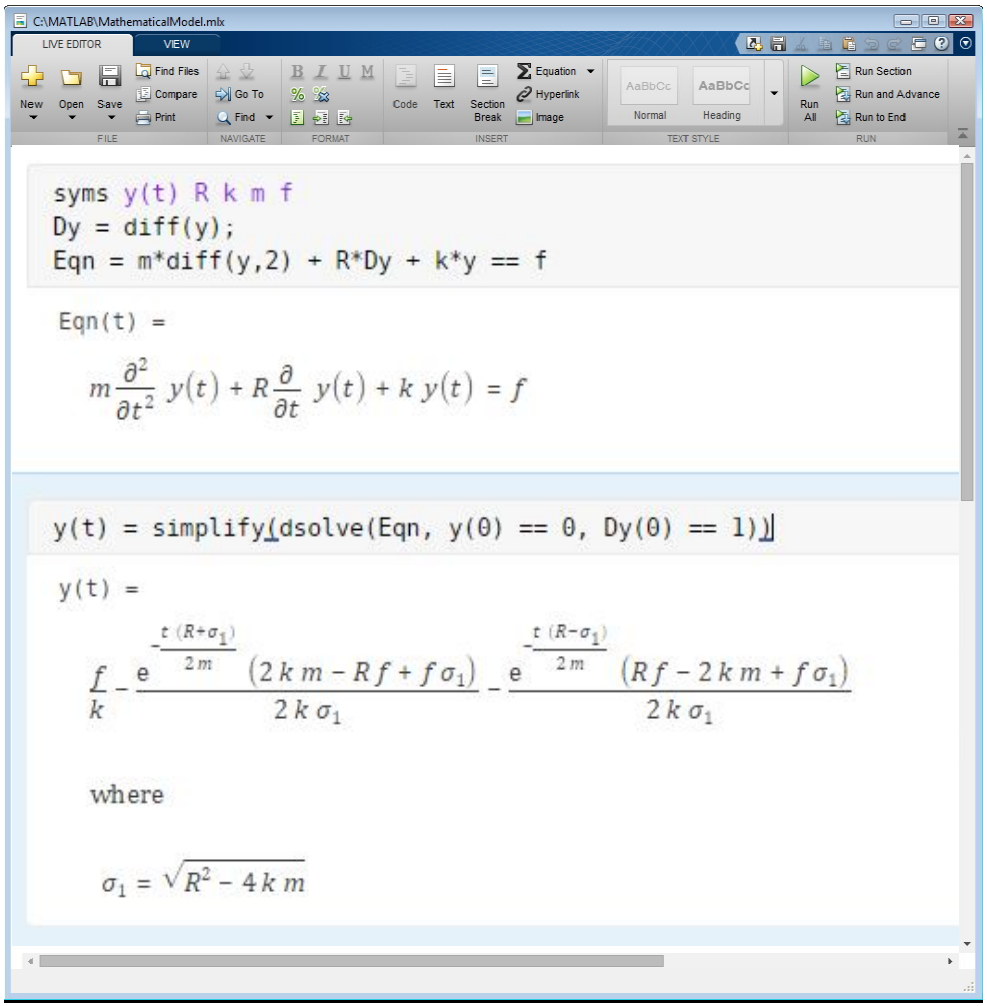
Teach with Live Scripts

- Create training materials that combine code and results with formatted text and mathematical equations
- Include images, and links to supporting materials
- Modify and run code on the fly to answer questions or explore related topics
- Share as interactive documents or in hardcopy format.
- Create partially completed files for individual assignments or team projects



Live Editor – Symbolic Math

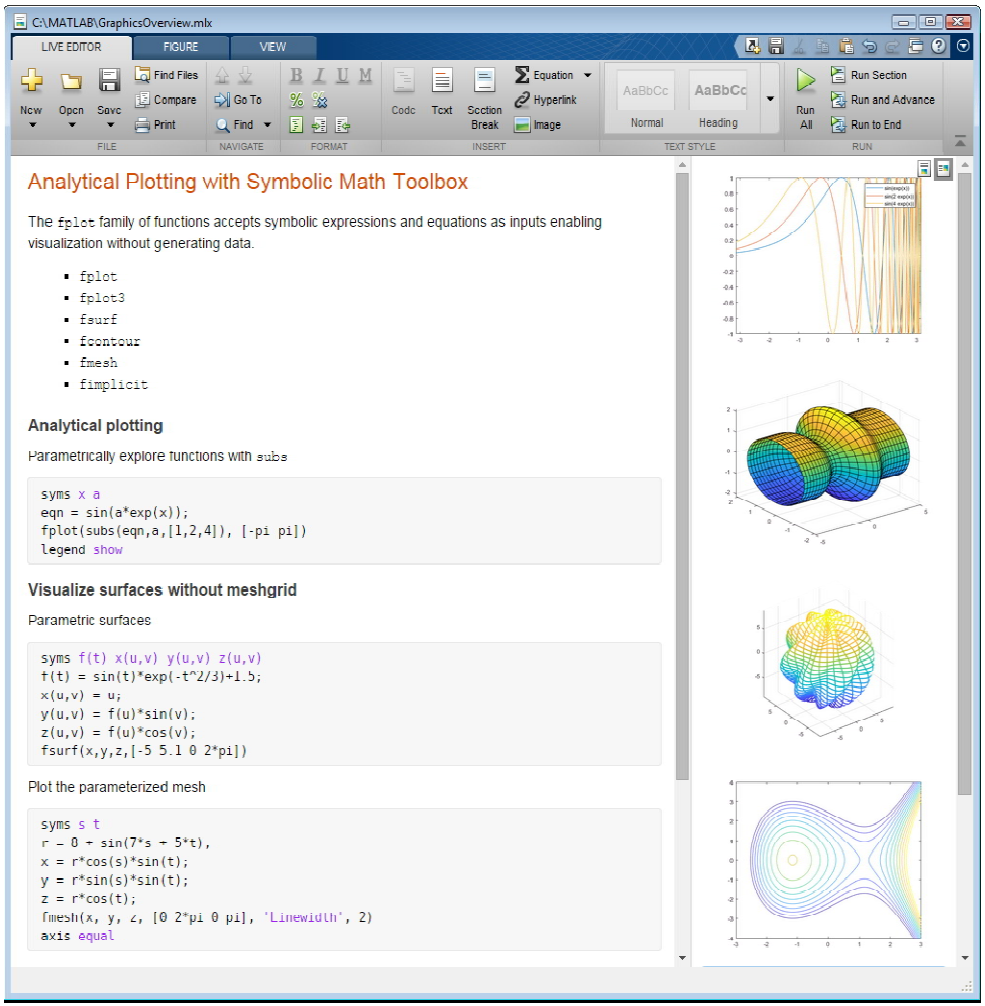
- **Math –** Create, manipulate, substitute and solve equations in a familiar mathematical typeset.



Live Editor – Symbolic Math

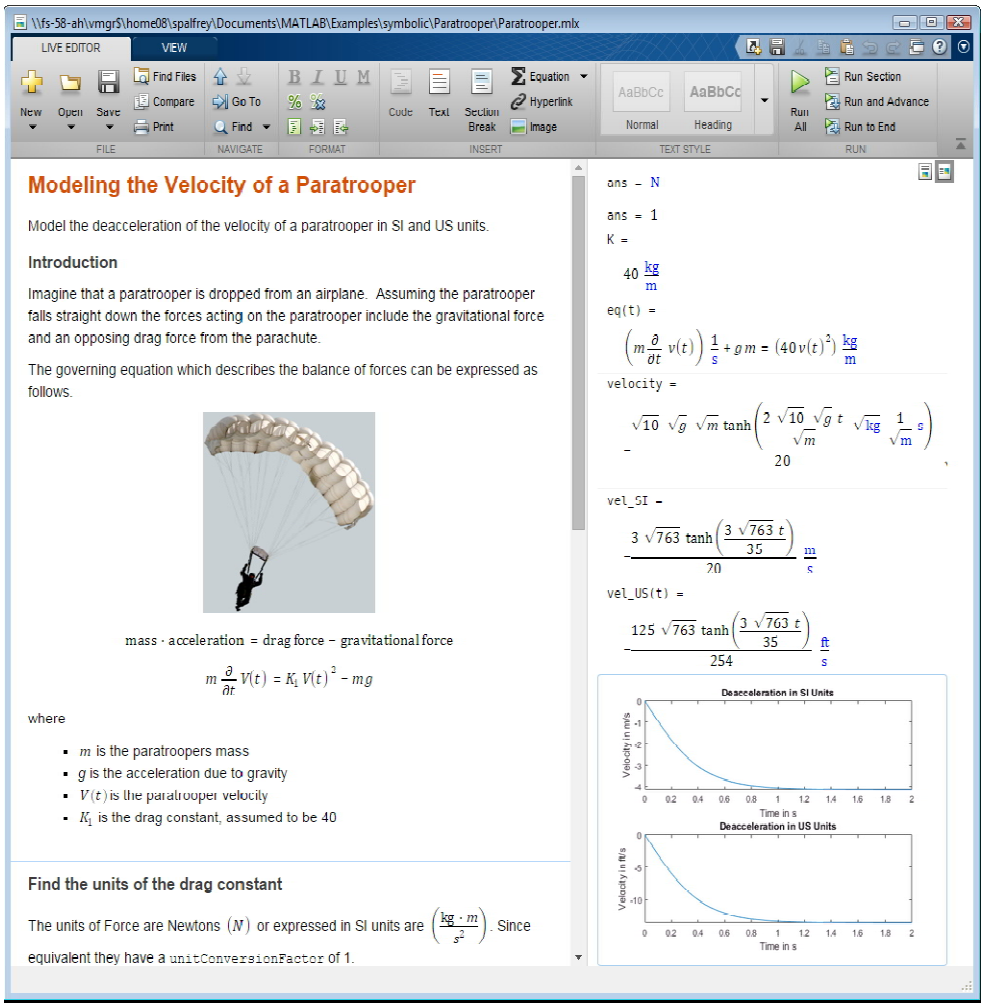
- **Math –** Create, manipulate, substitute and solve equations in a familiar mathematical typeset.

- **Visualize** – Plot expressions and equations without generating discrete data.



Live Editor – Symbolic Math

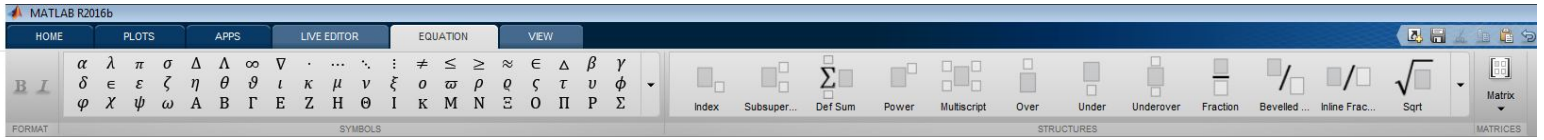
- **Math –** Create, manipulate, substitute and solve equations in a familiar mathematical typeset.
- **Visualize** – Plot expressions and equations without generating discrete data.
- **Units** – Work with dimensioned physical quantities.

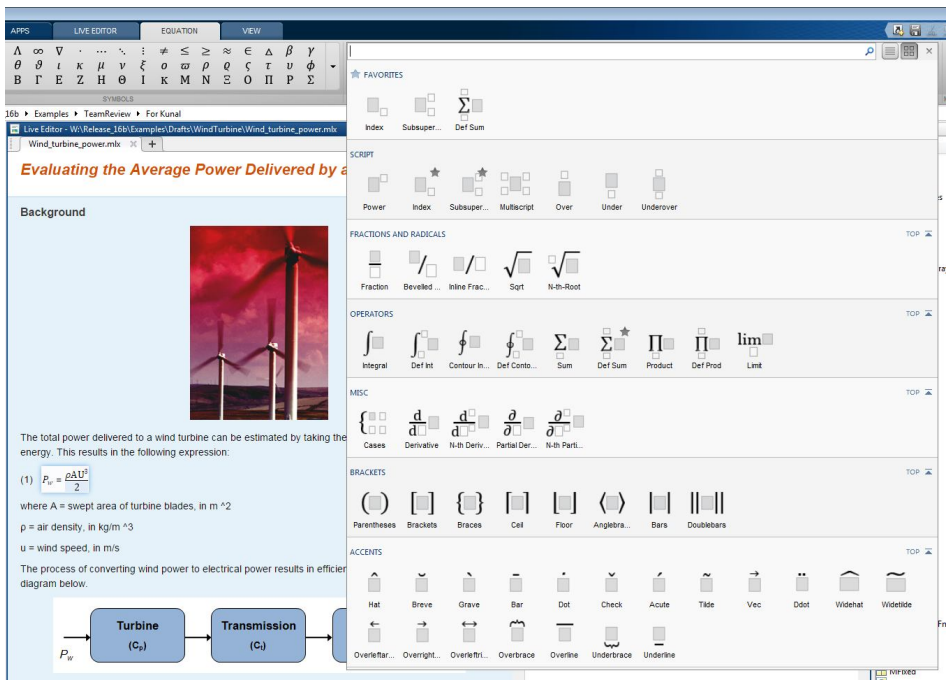


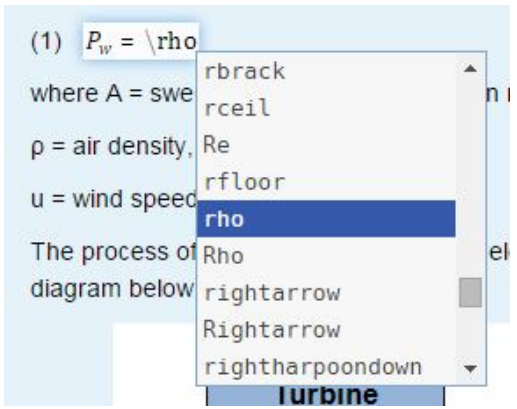
Live Editor – Equation Editing

Create equations

- Integrated equation editor
- Easy authoring of mathematics.
- Shortkeys
- Copy equation as LaTeX or MathML



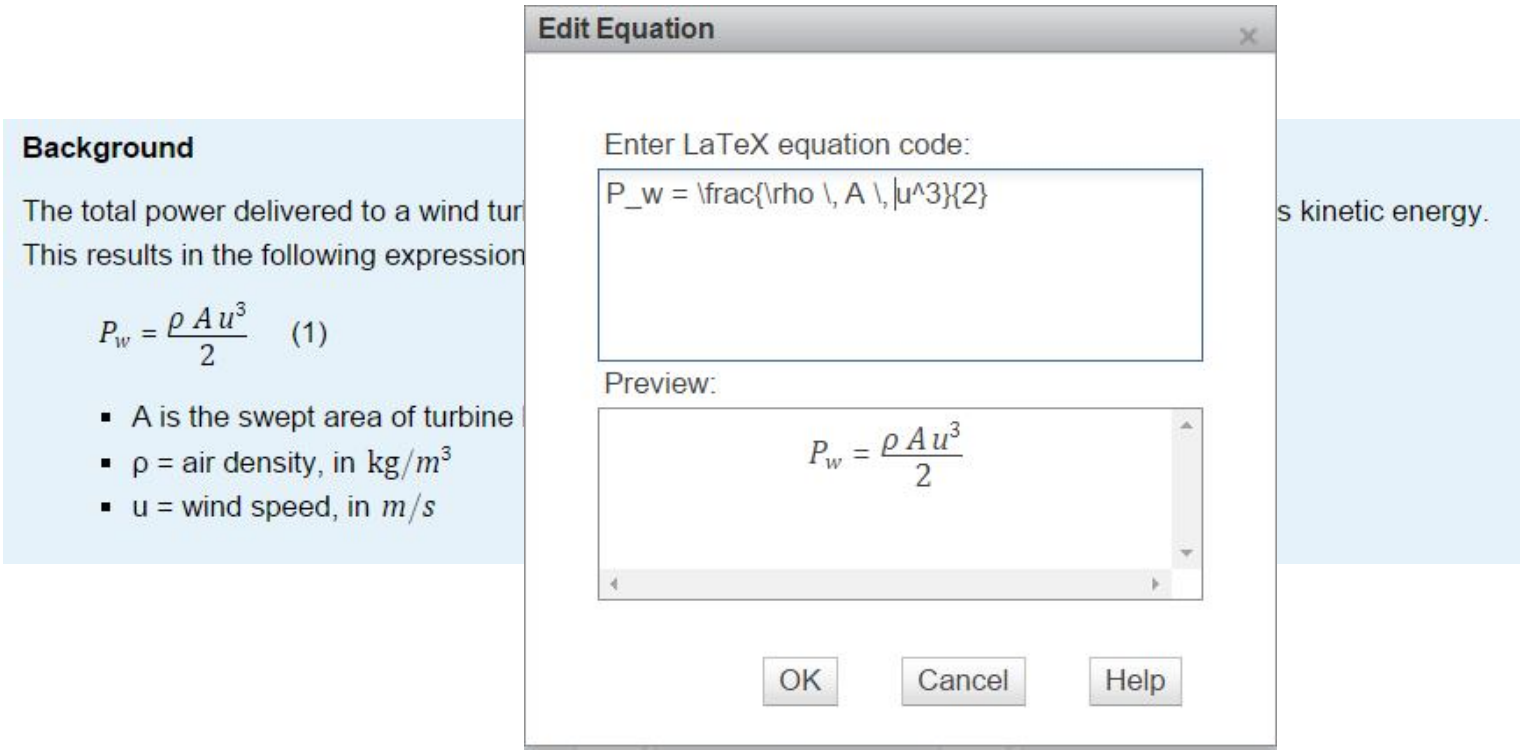




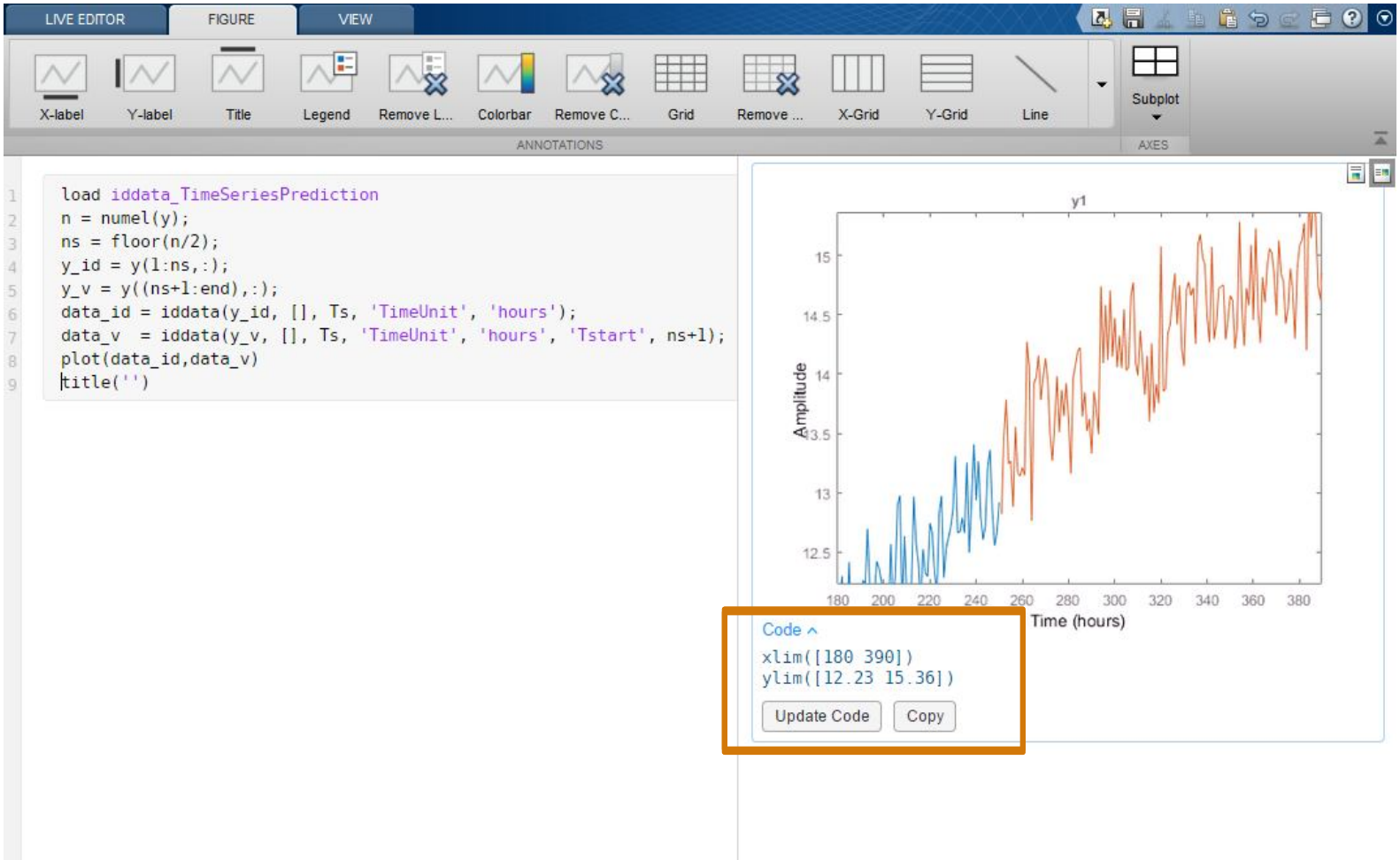
Live Editor – Equation Editing

Create equations

- LaTeX input.

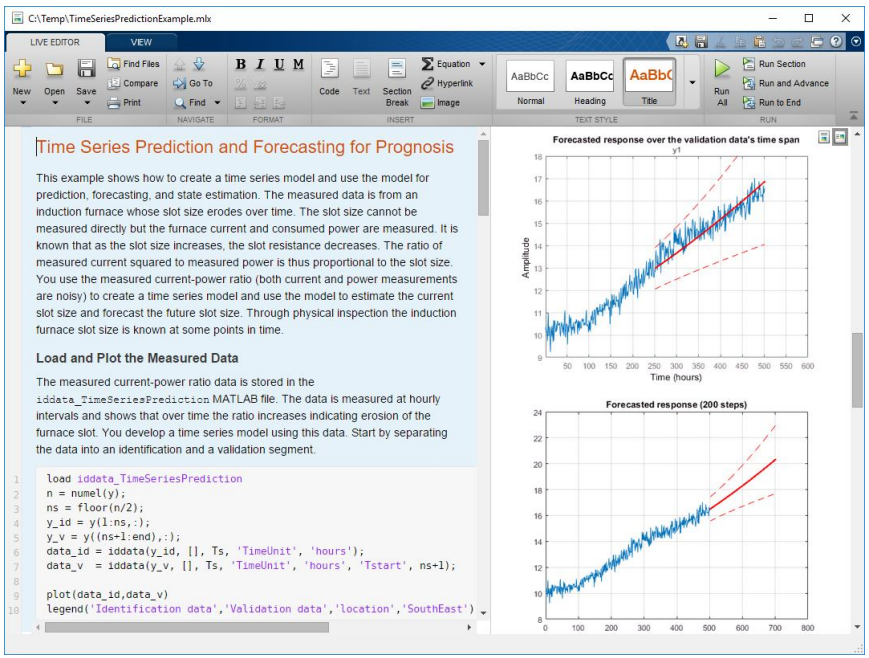


Live Editor – Interactive Figures

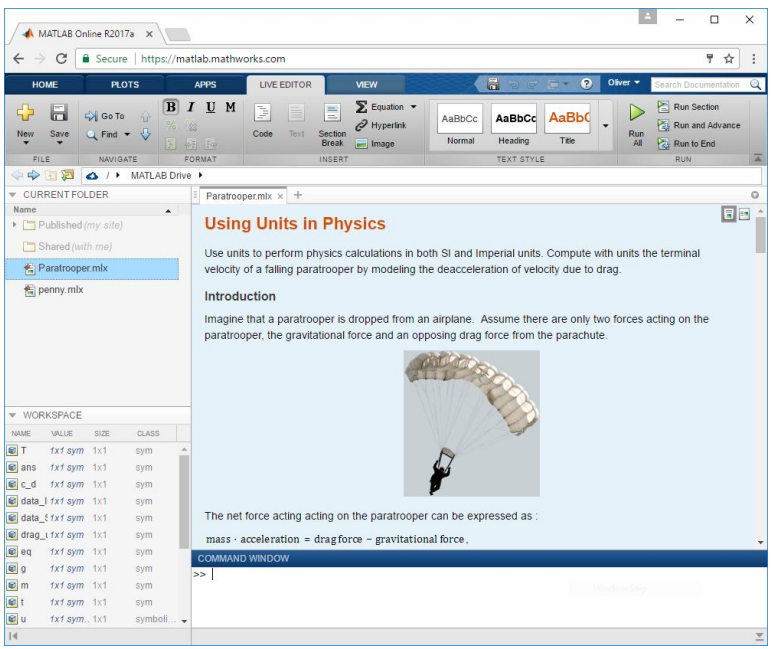


Live Editor – Availability

Desktop MATLAB



MATLAB Online



Live Scripts – Interoperability

Plain Scripts (.m scripts) can be opened as Live Scripts

Live Scripts can be saved as Plain Scripts

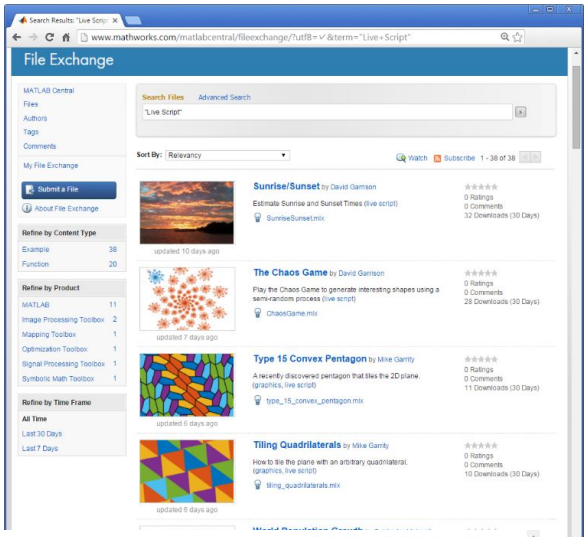
```
%% Time Series Prediction and Forecasting for Prognosis
% This example shows how to create a time series model and use the model
% for prediction, forecasting, and state estimation. The measured data is
% from an induction furnace whose slot size erodes over time. The slot size
% cannot be measured directly but the furnace current and consumed power
% are measured. It is known that as the slot size increases, the slot
% resistance decreases. The ratio of measured current squared to measured
% power is thus proportional to the slot size. You use the measured
```

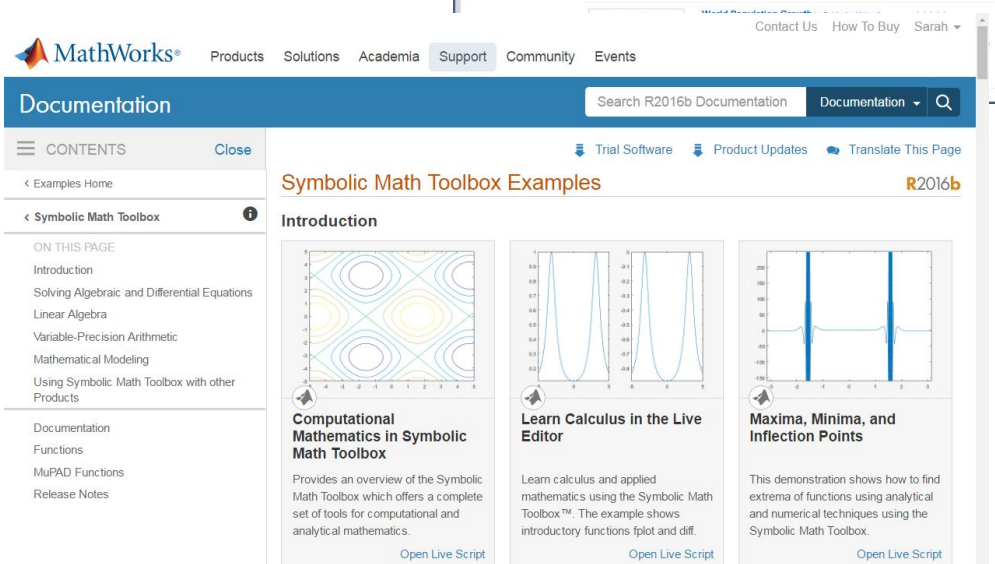
Time Series Prediction and Forecasting for Prognosis

This example shows how to create a time series model and use the model for prediction, forecasting, and state estimation. The measured data is from an induction furnace whose slot size erodes over time. The slot size cannot be measured directly but the furnace current and consumed power are measured. It is known that as the slot size increases, the slot resistance decreases. The ratio of measured current squared to measured power is thus proportional to the slot size. You use the measured current-power ratio (both current and power measurements are noisy) to create a time series model and use the model to estimate the current slot size and forecast the future slot

Learn More

- MATLAB Live Editor website
- Live Editor Webinar
- Documentation Examples
- Live scripts on File Exchange
- Symbolic Math Toolbox website





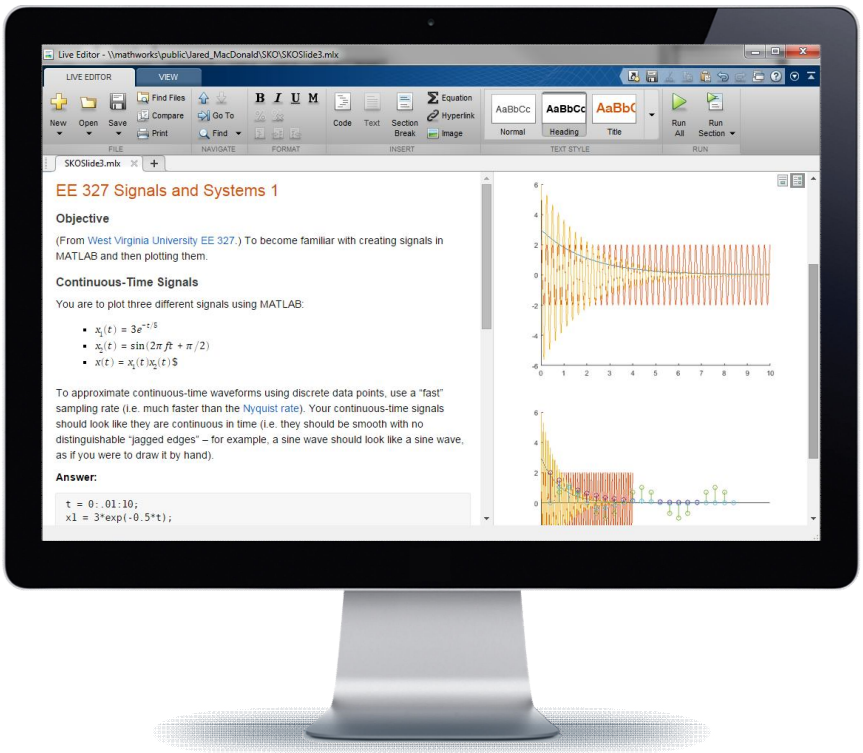
www.mathworks.com/products/matlab/live-editor
www.mathworks.com/products/symbolic/

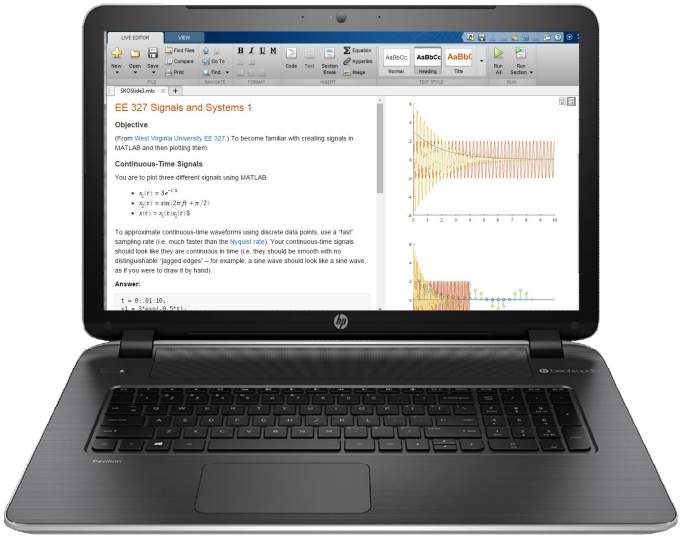
Live Editor – Additional Information

On the following slides additional information can be found:

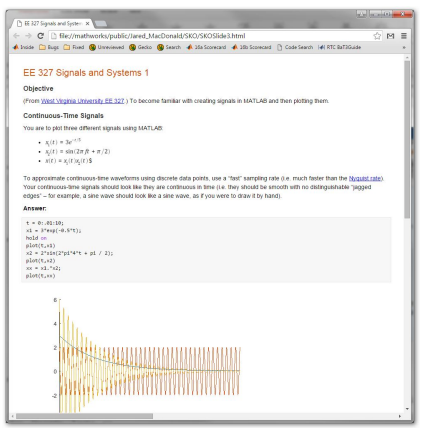
- Sharing Live Scripts
- Cross-Locale Sharing
- Functions in Scripts

Live Editor – Sharing

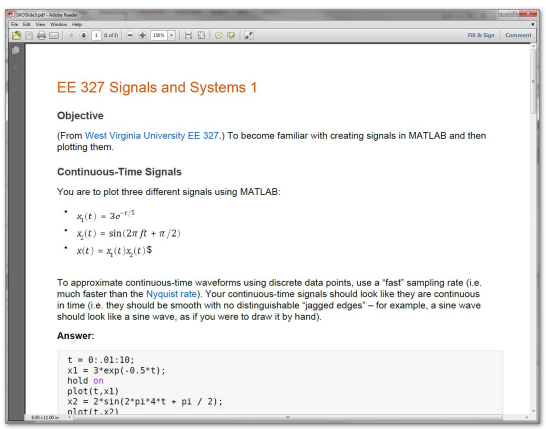




Colleague with MATLAB



HTML

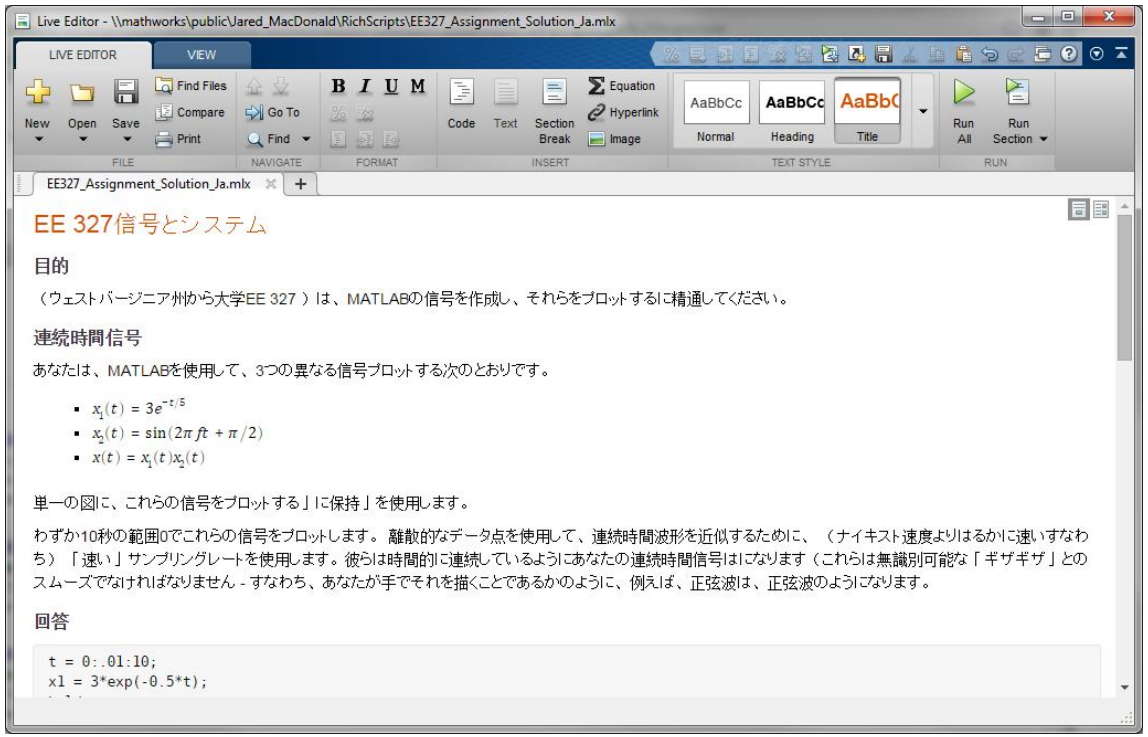


PDF

Live Editor – Cross-Locale Sharing

Characters are correctly preserved across platforms and locales

- Share without loss of data with colleagues around the world
- Include symbols and special characters in your comments



Live Editor – Functions in Scripts

Define and use functions from within a script, without needing to create a separate file