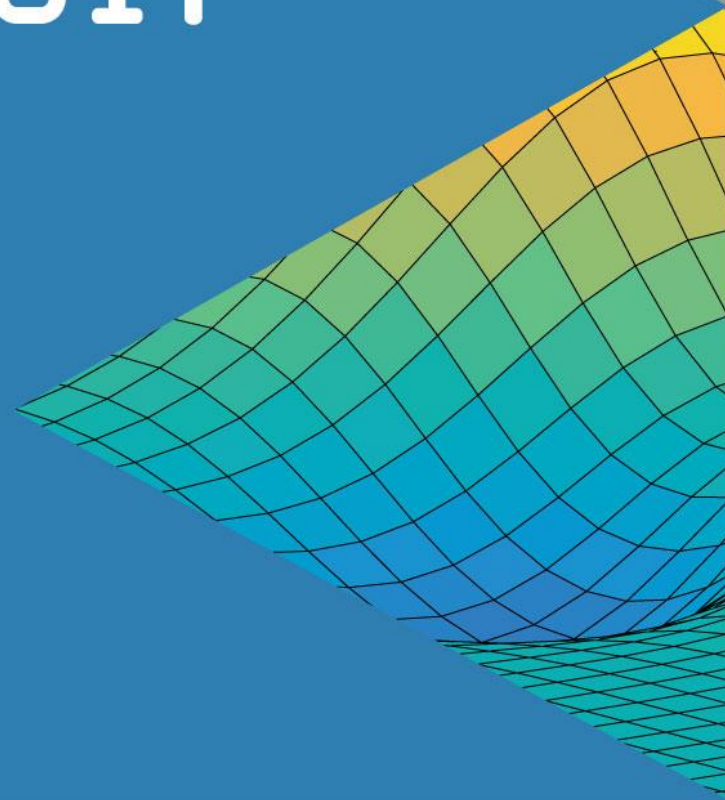


MATLAB EXPO 2017

KOREA

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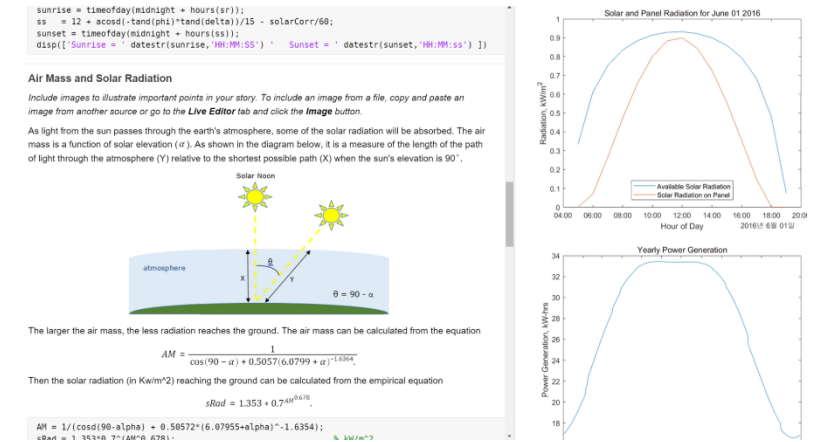


Introducing the MATLAB Live Editor

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Agenda

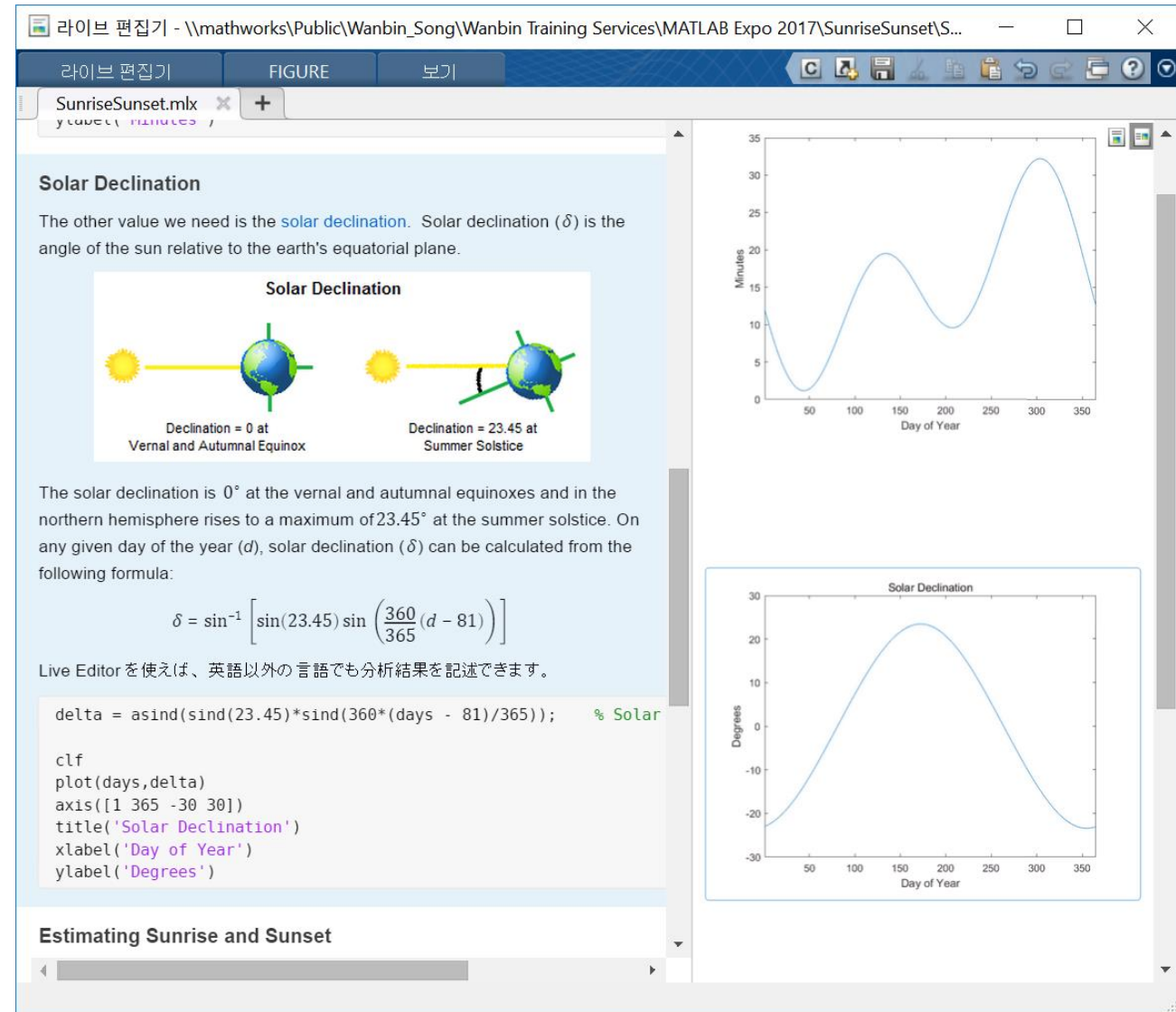
- What is the Live Editor?
- Live Editor Demo
- Using the Live Editor
- Summary

- [illegible]

What is the Live Editor?

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

- Write, edit, and run code in a single interactive environment
- Generate results and graphics in the Live Editor alongside the code that produced them
- Include LaTeX equations, images, and hyperlinks as supporting material to create an interactive narrative
- Share your narrative as a richly formatted, executable document with code and results



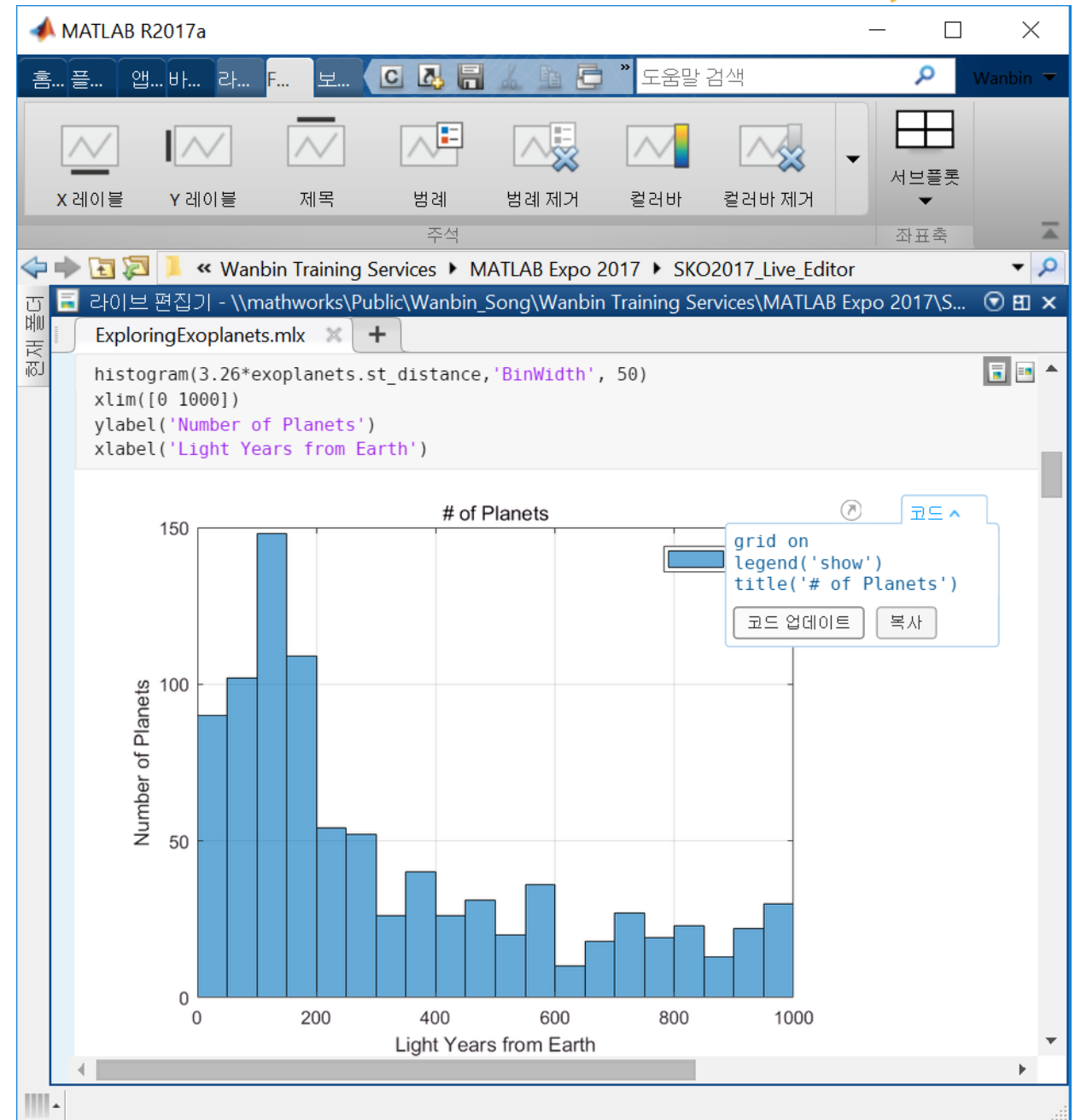
Live Editor Demo

Using the Live Editor

Accelerate Exploratory Programming

- Write, execute, and test code in a single interactive environment
- Generate results and graphics in the Live Editor alongside the code that produced them
- Find errors at the location in the file where they occur
- Suggests corrections for mistyped commands and variables
- Edit a figure interactively

R2017a



Using the Live Editor

Create an Interactive Narrative

- Add titles, headings, and formatted text
- Include LaTeX equations
- Add images, and hyperlinks as supporting material
- Save your narrative with code and results that others can use to validate and extend your results
- Convert interactive documents to HTML or PDF for publication

LiveEditorInteractiveNarrative.pdf - Adobe Acrobat

File Edit View Document Comments Forms Tools Advanced Window Help

Power Generation in Solar Cells

Overall Approach

In this example we will estimate the **power output** from a typical solar panel installation. We will use 12 noon on June 1st in Boston to illustrate how to calculate the following:

- Solar time
- Solar declination and solar elevation
- Air mass and the solar radiation reaching the earth's surface
- Radiation on a solar panel given its position, tilt, and efficiency
- Power generated in a day and over the entire year

We will use these formulas to plot solar and panel radiation for our example day, and then plot the expected panel power generation over the course of a year. We'll use two MATLAB functions created for this analysis, `solarCorrection` and `hourlyPanelRadiation`, to streamline the analysis.

Solar Time

Show output together with the code that produced it. To run a section of code, go to the **Live Editor** tab and click the **Run Section** button.

Power generation in a solar panel depends on how much solar radiation reaches the panel which in turn depends on the sun's position relative to the panel as the sun moves across the sky.

```
lambda = -71.06; % Boston longitude
phi = 42.36; % Boston latitude
UTCoff = -5; % Boston UTC offset
TZ = ['UTC' num2str(UTCoff)];
january1 = datetime(2016,1,1,'TimeZone',TZ); % January 1st
localTime = datetime(2016,6,1,12,0,0,'TimeZone',TZ) % Noon on June 1
```

```
localTime = datetime
2016-06-01 12:00:00
```

To calculate the sun's position for a given date and time we need to use *solar time*. Twelve noon solar time is defined to be the time when the sun is highest in the sky. To calculate solar time we apply a

8.50 x 11.00 in

Using the Live Editor

Teach with Live Scripts

- Create lectures 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 lectures with students as interactive documents or in hardcopy format.
- Create partially completed files for individual assignments or team projects

라이브 편집기 - \\central-kr\home\$\wsong\Documents\MATLAB\Examples\matlab\Tea...

라이브 편집기 보기

TeachWithLiveScripts.mlx* +

Knowing this, we can write the following expression for i :

$$i = \cos\left((2k + 1/2)\pi\right) + i \sin\left((2k + 1/2)\pi\right).$$

Taking the n th root of both sides gives

$$i^{1/n} = \left(\cos\left((2k + 1/2)\pi\right) + i \sin\left((2k + 1/2)\pi\right)\right)^{1/n}$$

and by de Moivre's theorem we get

$$i^{1/n} = \left(\cos\left((2k + 1/2)\pi\right) + i \sin\left((2k + 1/2)\pi\right)\right)^{1/n} = \cos\left(\frac{(2k + 1/2)\pi}{n}\right) + i \sin\left(\frac{(2k + 1/2)\pi}{n}\right).$$

Homework

Use live scripts as the basis for assignments. Give students the live script used in the lecture and have them complete exercises that test their understanding of the material.

Use the techniques described above to complete the following exercises:

Exercise 1: Write MATLAB code to calculate the 3 cube roots of i .

% MATLAB 코드를 입력해보세요

Exercise 2: Write MATLAB code to calculate the 5 fifth roots of -1 .

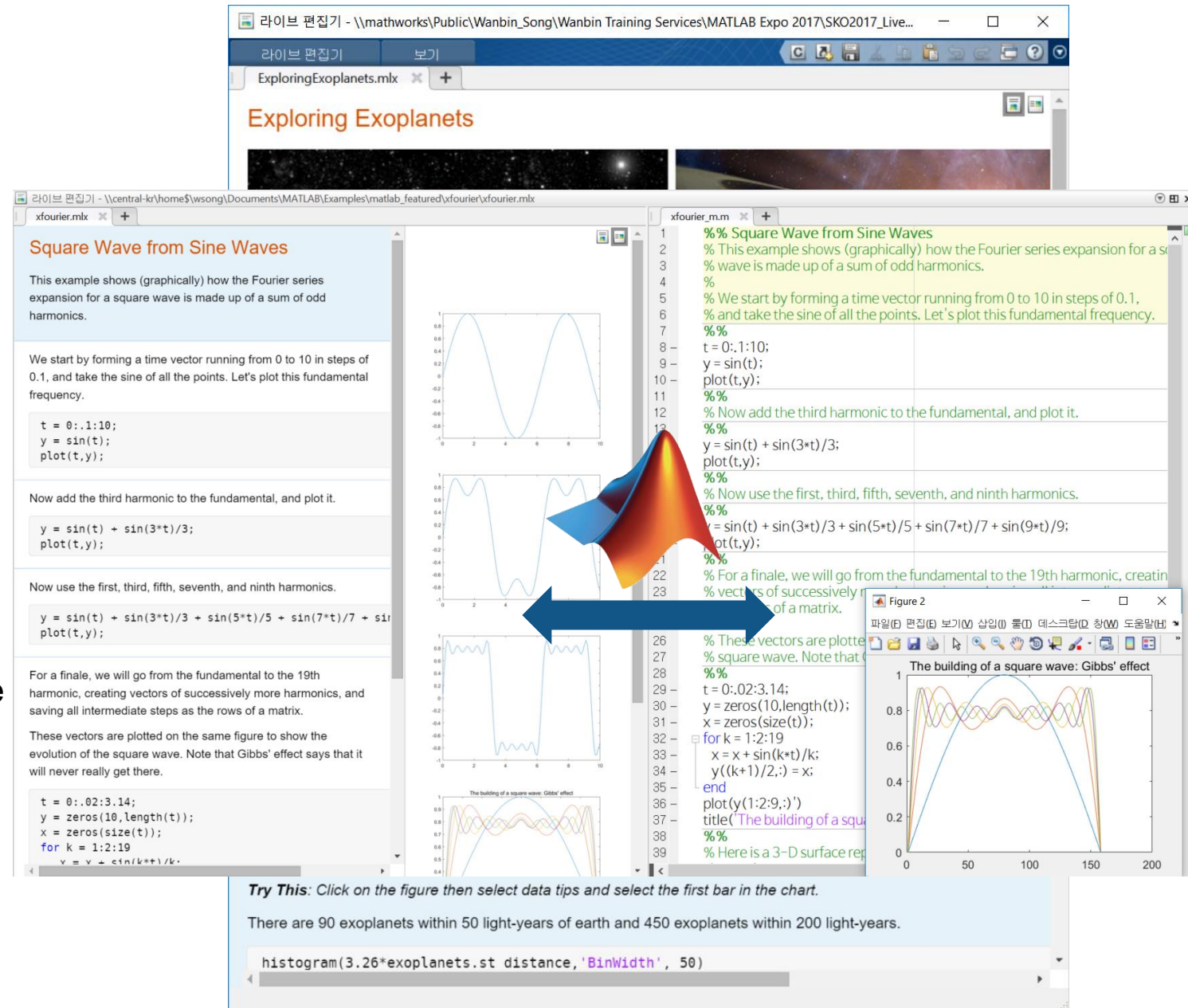
% MATLAB 코드를 입력해보세요

Exercise 3: Describe the mathematical approach you would use to calculate the n th roots of an arbitrary complex number. Include the equations you used in your approach.

(여기에 작성해 보세요.)

Summary

- Key Takeaways
 - New form of Coding
 - Documentation
 - Visualization of Outputs
 - Still MATLAB
 - Compatible with MATLAB Script
 - Do not need to learn new language



Summary

- Try today in our Demo booth

