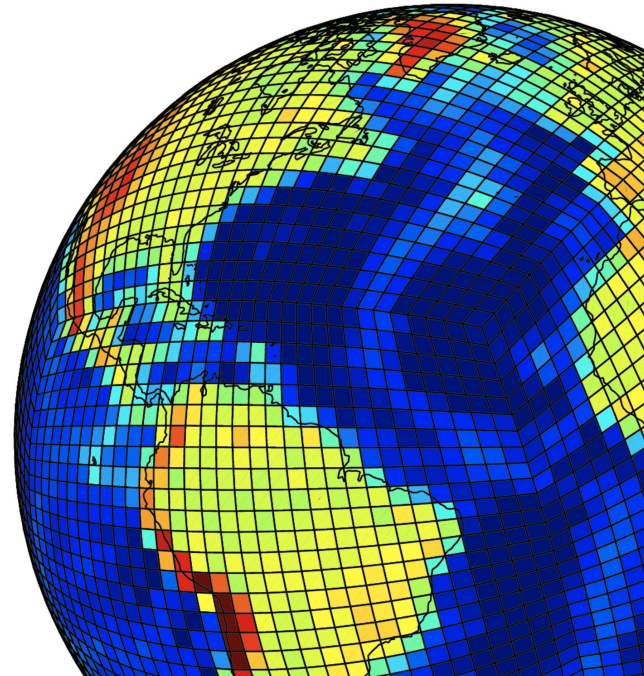
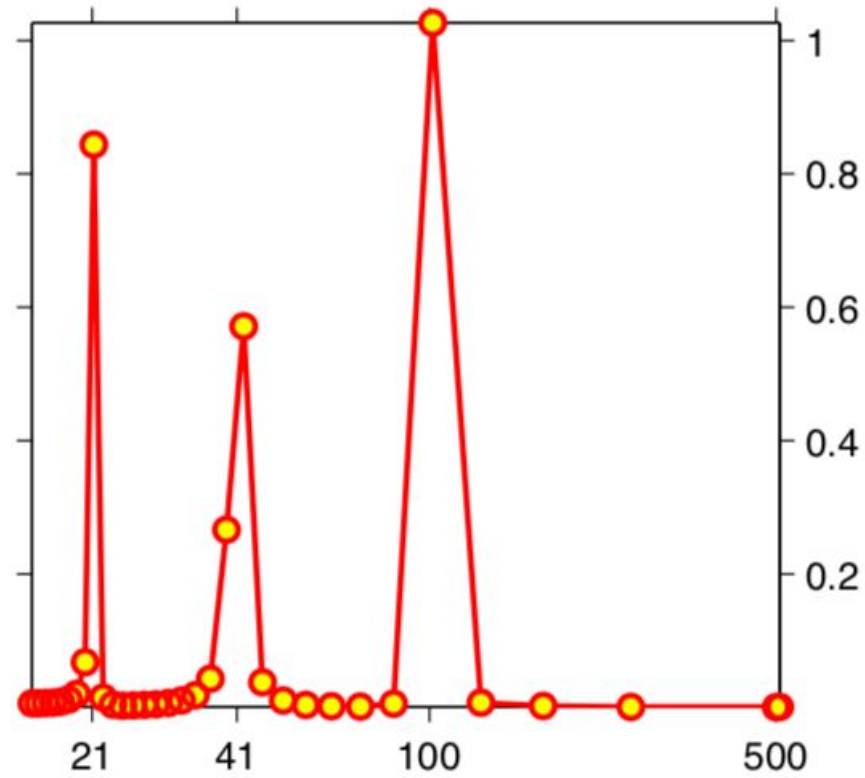
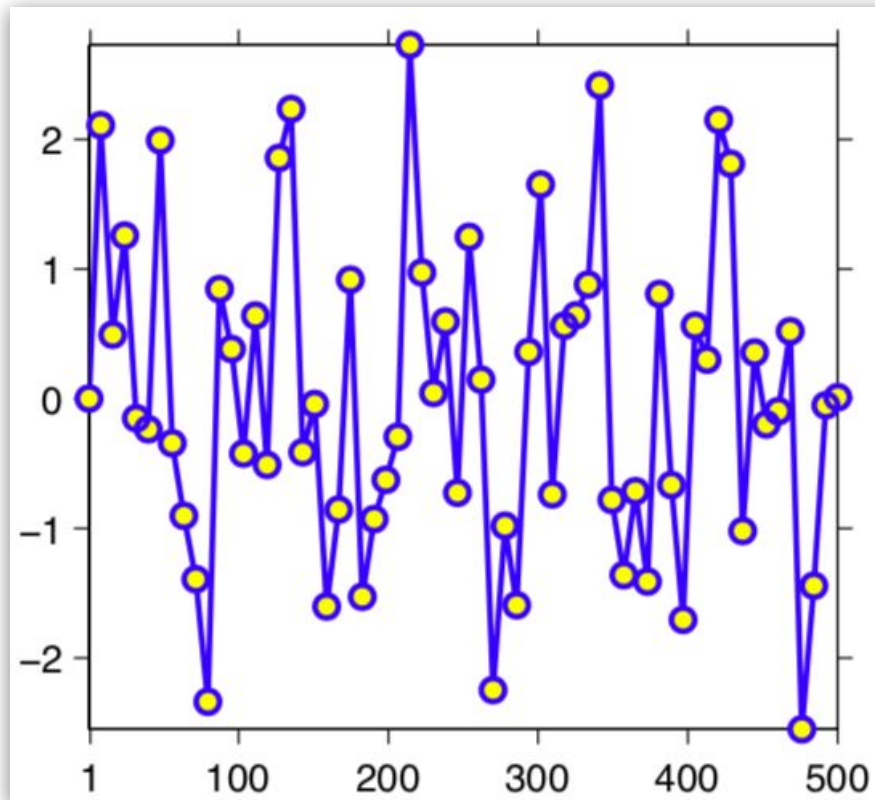


Data Analysis, Using MATLAB

Frederik J Simons
Princeton University

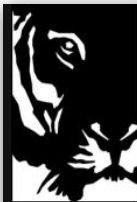




MATLAB is a *program*—many ways to use

MATLAB is a *language*—many ways to learn

MATLAB is a *community*—many ways to join

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MATLAB Users Group

The MATLAB Users Group provides opportunities for campus MATLAB users to learn more about using MATLAB, help each other, and learn more about research and teaching being done at Princeton using MATLAB. To be added to the group's mailing list or to volunteer to help with planning and putting on future events, send e-mail to rcinfo@princeton.edu [✉](#)

Past events

Thursday, March 8, 4:30 pm - 6:00 pm
120 Lewis Science Library, Washington Road & Ivy Lane

From medical diagnosis, speech and handwriting recognition to automated trading and movie recommendations, machine learning techniques are being used to make critical business and life decisions every moment of the day. In this session, we explore the fundamentals of machine learning using MATLAB. Working with a range of classification models, we will perform model assessment and comparisons.

Dr. Elvira Osuna-Highley is a Senior Customer Success Engineer at MathWorks, where she supports faculty in their teaching and research with MATLAB. Prior to joining MathWorks, she was a Lecturer in the Computational Biology department at Carnegie Mellon University. Dr. Osuna-Highley holds a doctorate in Biomedical Engineering from Carnegie Mellon University.

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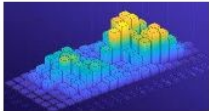
MATLAB



MATLAB Onramp

14 modules | 2 hours | [Languages](#)

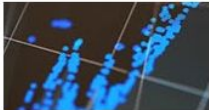
Get started quickly with the basics of MATLAB.



MATLAB Fundamentals

18 modules | 16.5 hours | [Languages](#)

Learn core MATLAB functionality for data analysis, modeling, and programming.



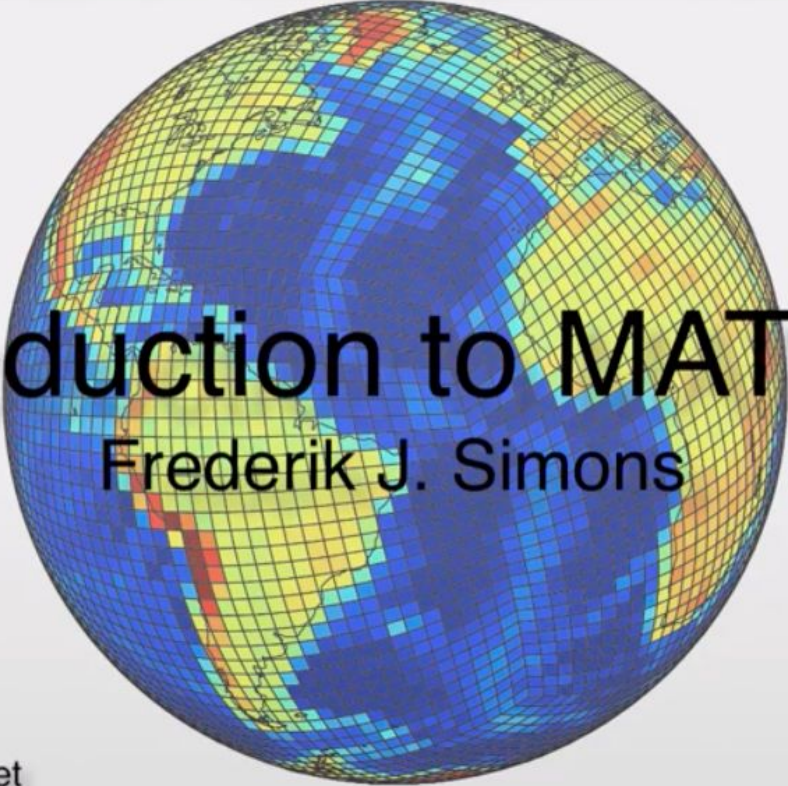
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Create custom visualizations and automate your data analysis tasks.

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Introduction to MATLAB

Frederik J. Simons

www.frederik.net

003

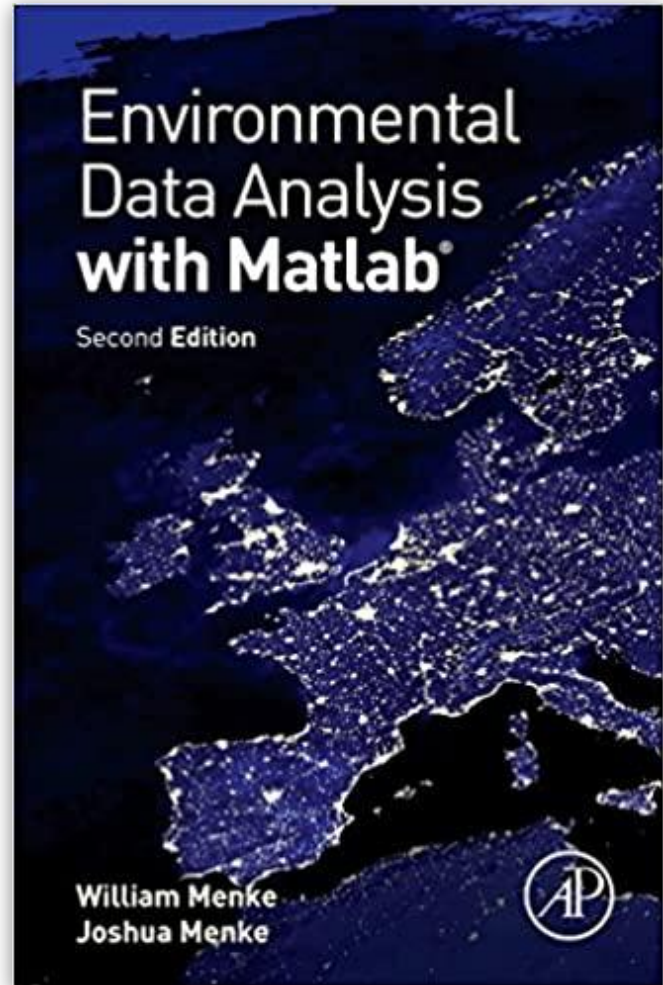
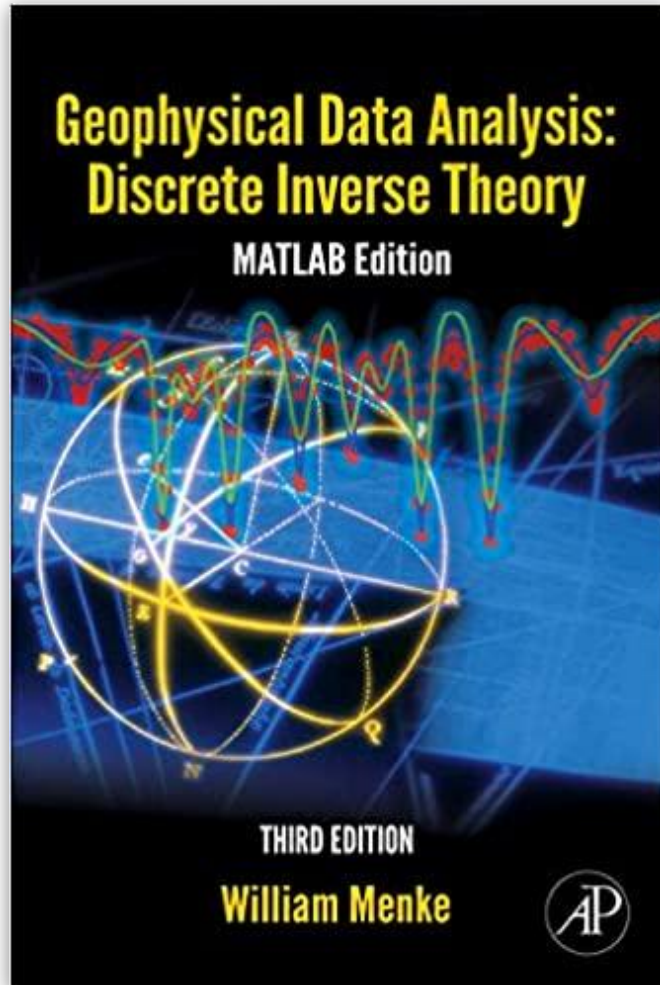
Into MATLAB | 003

100 weergaven • 9 aug. 2016

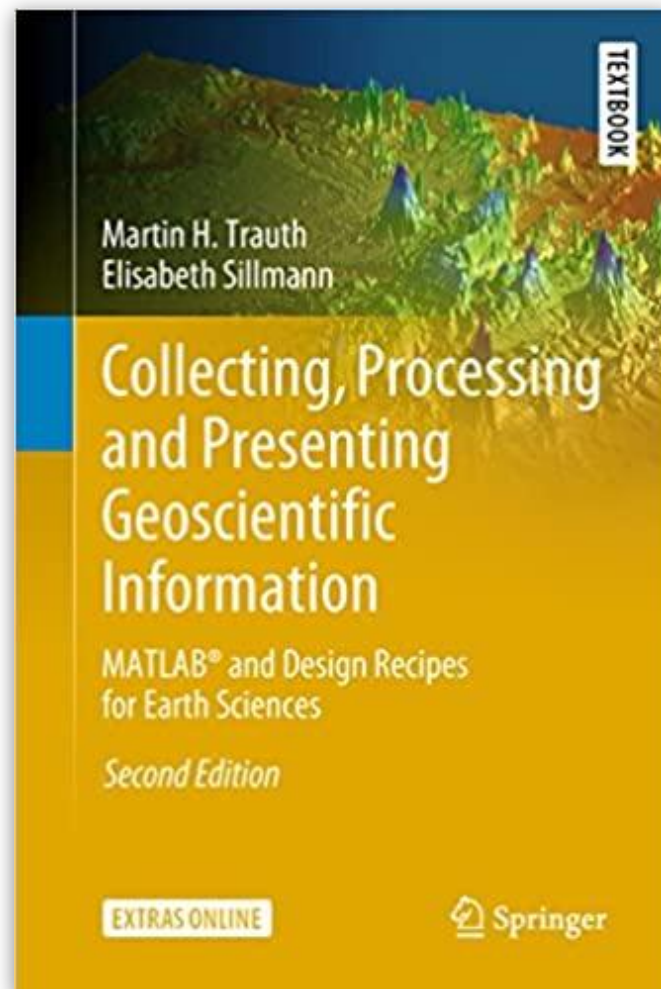
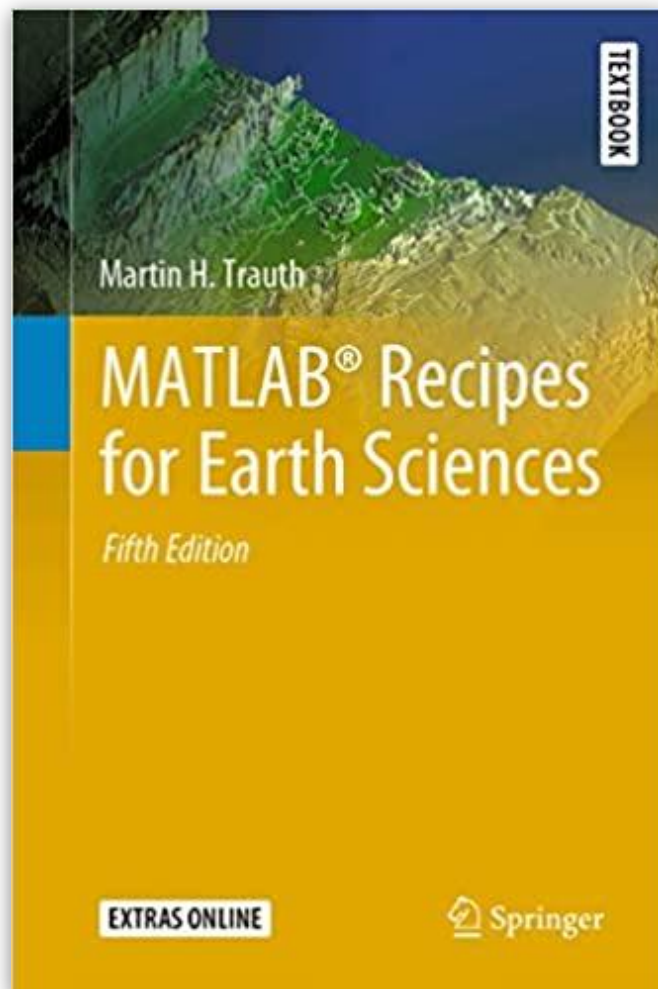
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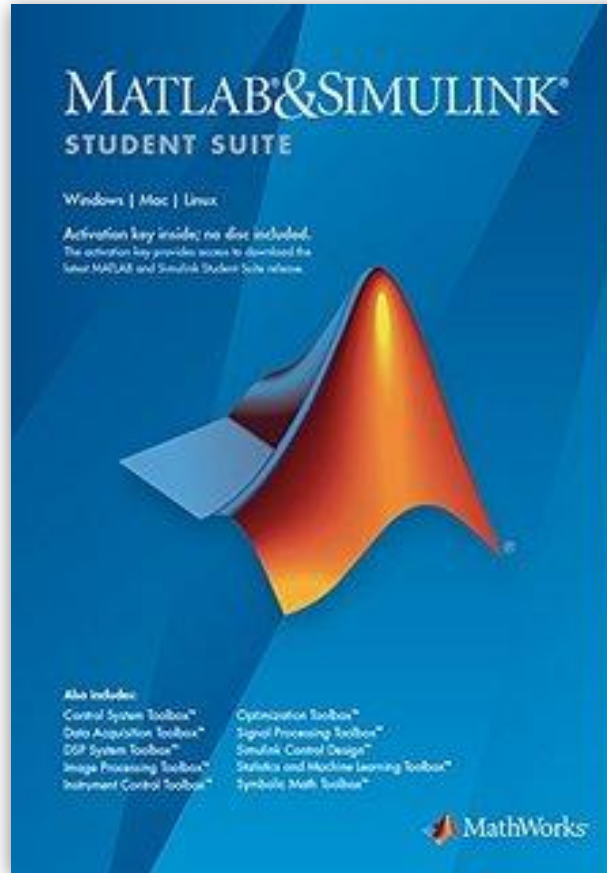
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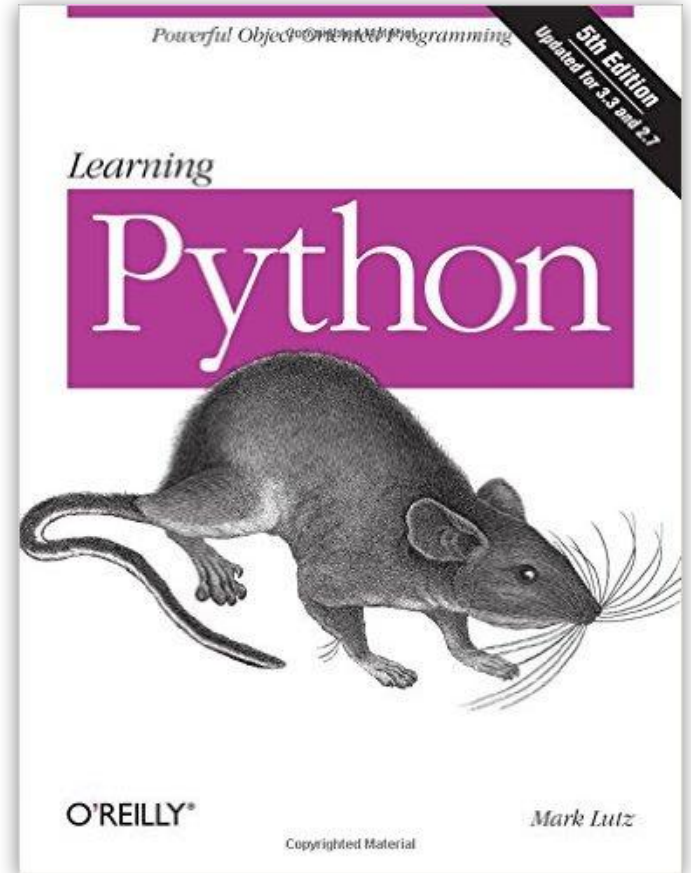
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Books



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\$50 book, free code

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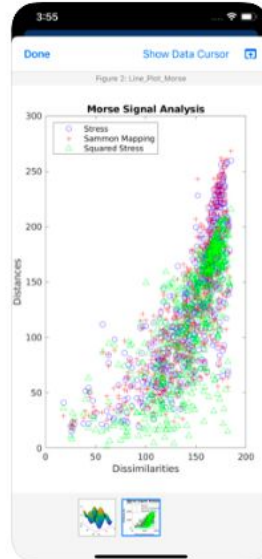
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Frederik Simons

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Create a sequence of numbers

Find a specific entry in a vector

Make a formatted string

ADD PROBLEM

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Week 4

Week 5

Week 6

ADD ASSIGNMENT

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Wintersession 2022 > Week 1 >

Create a sequence of numbers

Edit | Actions

Problem Summary

Generate a sequence of numbers *between 2 and 22 (inclusive), spaced 2 apart*. You can use a colon operator, or you can use a pre-programmed function such as `linspace`. The variable that you create must be called `y`.

You may or may not close with a semicolon, to suppress output to your screen. There are, literally, an infinite number of ways in which you can accomplish what's asked. You may choose to use brackets or not in this example. In the template, I have suggested square brackets within which you can type your solution.

Your *script*, the answer to this question, need only be that one line long! And you need only type within the brackets.

Learner Preview

Learner Analytics: How Learners Are Doing on the Problem



Class Overview

- Percent solved / not solved
- Average number of submissions
- Which tests are hardest



Learner Solutions

- Search solutions
- Map and List views of solutions

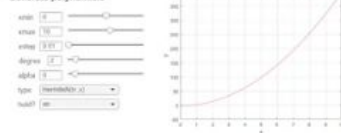
Live

Live Script Gallery

Open and run these example live scripts from the MATLAB Community.

Create your own live scripts using the [Live Editor](#). Combine code, output, and formatted text in a single executable document.

Interactive example
Generate polynomials



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Remove Trends
Remove 20th degree polynomial from noisyECG



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Loren



Loren on the Art of MATLAB

Turn ideas into MATLAB

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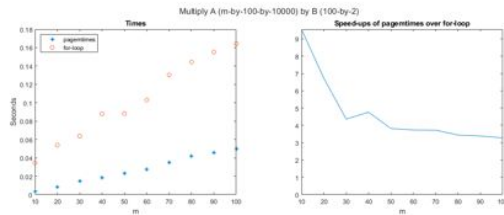
Community Treasure Hunt

Find the treasures in MATLAB Central and discover how the community can help you!

» [Start Hunting!](#)

Paged Matrix Functions 6

Posted by [Loren Shure](#), January 14, 2021



Today's guest blogger is Mary Fenelon, who is the product marketing manager for Optimization and Math here at MathWorks. In today's post she describes how using the new paged matrix functions can... [read more >>](#)

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How to Chart My Year (Redux)

Posted by [Loren Shure](#), December 22, 2020

Loren's 2020 mostly NON Travels



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I am a geologically inspired, geophysically educated, computationally motivated and mathematically minded geoscientist

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FILE EXCHANGE
12,894 RANK of 16,237
ACTIVITY(12 MONTHS)

MATLAB ANSWERS
29,085 RANK of 224,804
ACTIVITY(12 MONTHS)

CODY
N/A
ACTIVITY(12 MONTHS)

THINGSPEAK
N/A
ACTIVITY(12 MONTHS)

Contributions in All

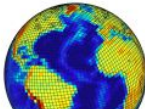
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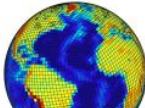


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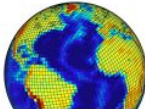


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Frederik J Simons
fjsimons

I am a geologically inspired, geophysically educated, computationally motivated and mathematically minded geoscientist, passionate about reproducible research.

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● MATLAB ☆ 14 🍷 25

 [csdms-contrib/slepian_juliet](#)
Maximum-likelihood analysis of univariate isotropic Matérn random fields
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 [earthscopeoceans](#)
Website for www.earthscopeoceans.org
● HTML 🍷 1

 [csdms-contrib/slepian_cubed-sphere](#)
Cubed-sphere
● MATLAB

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Seismic and GPS processing bits and pieces
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Less  More

Emacs

```
fjsimons@lemaitre — tcsh
x fjsimons@lemaitre — emacs -nw drop2... fjsimons@lemaitre — -tcsh fjsimons@dynamic-oit-vapornet100-1... fjsimons@stadius — -tcsh ... +

% Start the actual data structure... some versions have empties
d.(char(v1{1}))=char(v2{1});
end

% Pick out the data variable names
vnames=h{4}; vnames(abs(vnames)==32)='';
% You'll now know there are FOUR to SIX variables of interest (any empties?)
[~,v1,v2,v3,v4,v5,v6]=strread(vnames,'%q%q%q%q%q%q','delimiter','');

% Pick out the unit name strings
index=5;
vnames=h{index}; vnames(abs(vnames)==32)='';
% You'll now know there are FOUR to SIX units of interest (two empties?)
[~,u1,u2,u3,u4,u5,u6]=strread(vnames,'%q%q%q%q%q%q','delimiter','');

% For the next loop, it's a DROP 2 or a DROP 3
maxi=5+~isempty(u5)*2;

% Give the variables their proper place
for index=2:maxi
% Don't redo the time, you've got it already
b=char(a{index});
% Comma goes to decimal point
b(abs(b)==44)='.';
% Final assignment to human-intelligible variables
c{index}=str2num(b);
% Hark back to the old spitout subfunction
eval(sprintf('d.(char(v%i))=c{%i};',index-1,index))
--uu-:---F1 drop2mat.m 31% L79 (Matlab Fill)-----
Find file: ~/PROGRAMS/MFILES/git/slepian_zero/
```

Anatomy

```
fjsimons@lemaitre — tcsh
fjsimons@lemaitre — emacs -n... fjsimons@lemaitre — ssh -Y -Y... fjsimons@dynamic-oit-vapor... fjsimons@stadius — -tcsh ... +

function varargout=anatomy(fname,snumber)
% [t,d]=ANATOMY(fname,snumber)
%
% Anatomy of a proper and flexible function
%
% INPUT:
%
% fname      A complete file name string
% snumber    Some numbers(s) [default: 21]
%
% OUTPUT:
%
% t          The timestamp as a DATETIME array
% d          The data as a STRUCTURE array
%
% SEE ALSO: MARK2MAT
%
% EXAMPLE: drop2mat('demo1')
%
% TESTED ON: MATLAB Version: 9.8.0.1451342 (R2020a) Update 5
%
% Last modified by fjsimons-at-alum.mit.edu, 01/19/2021

if isempty(strfind(fname,'demo'))
    % Do something interesting

elseif strcmp(fname,'demo1')
    % Call your own example... check out DEFVAL
    [t,d]=anatomy('somefile',pi);
end

% Optional output
varns={t,d};
varargout=varns(1:nargout);

--uu:---F1 anatomy.m All L28 (Matlab Fill)-----
Wrote /Users/fjsimons/PROGRAMS/MFILES/anatomy.m
```

Git

```
fjsimons@lemaitre — tcsh
fjsimons@lemaitre — -tcsh  fjsimons@lemaitre — -tcsh  fjsimons@dynamic-cit-vapornet100-1...  fjsimons@stadius — -tcsh  ... +

stadius:slepian_alpha% git log -4
commit 414aee7299c75f5bb9381d510beef95a225126b5 (HEAD -> master, origin/master, origin/HEAD)
Author: Frederik J Simons <fjsimons@gmail.com>
Date: Tue Oct 13 11:05:10 2020 -0400

    Update README.md

commit ca2ba044b403d73d6a815c2356034ba83051fde6 (tag: 1.0.5)
Author: Frederik J. Simons <fjsimons@gmail.com>
Date: Thu Aug 20 13:26:46 2020 -0400

    Backus-Robin asymptotic approximation of Legendre polynomials

commit 277127ad36da24f7e2a79648b6e32b7af78849d3
Author: Frederik J. Simons <fjsimons@gmail.com>
Date: Mon Aug 17 14:10:11 2020 -0400

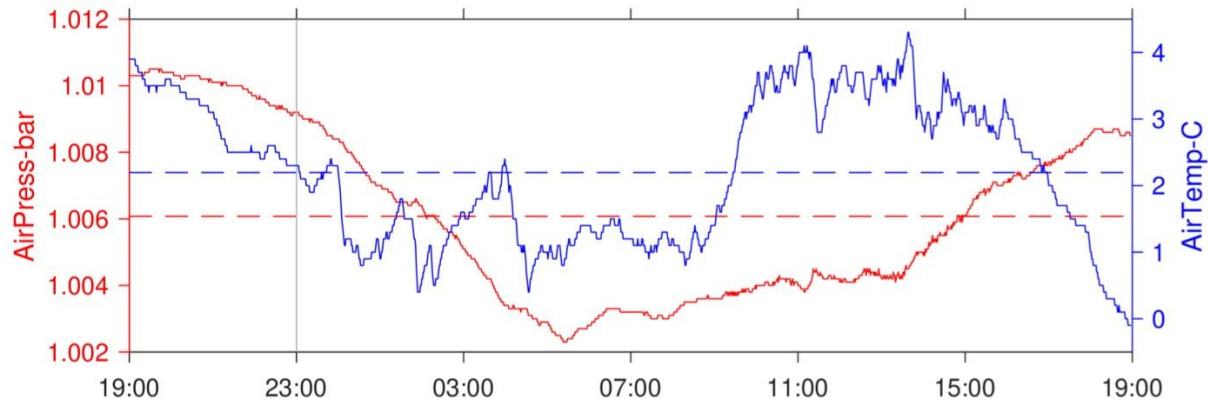
    Moves a graphics handle to the bottom of the stack

commit c27b89e98095d07827754bba3aa17048d40d4177
Author: Frederik J. Simons <fjsimons@gmail.com>
Date: Mon Aug 17 14:10:00 2020 -0400

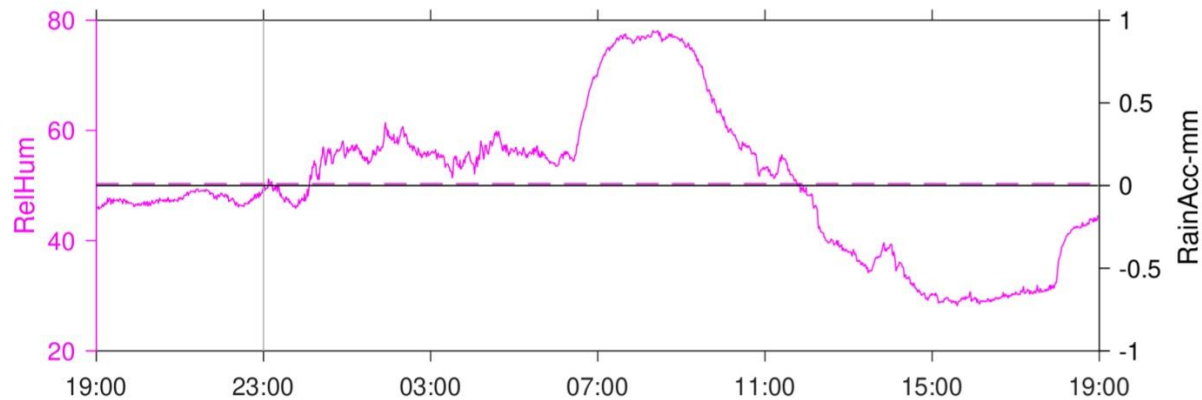
    Moves a graphics handle to the top of the stack
stadius:slepian_alpha% git status
On branch master
Your branch is up to date with 'origin/master'.

nothing to commit, working tree clean
stadius:slepian_alpha% █
```

AirPress-bar / AirTemp-C 20-Jan-2021 (UTC day 20)



RelHum / RainAcc-mm 20-Jan-2021 (UTC day 20)



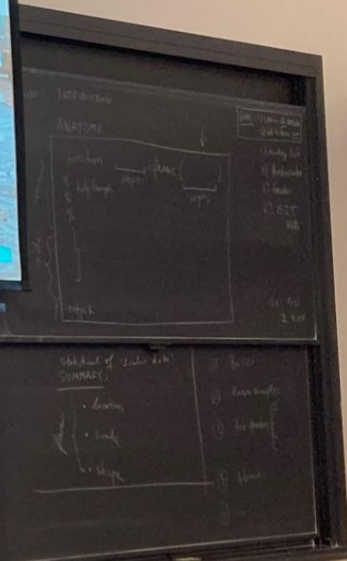
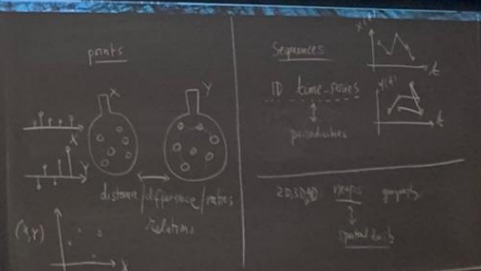
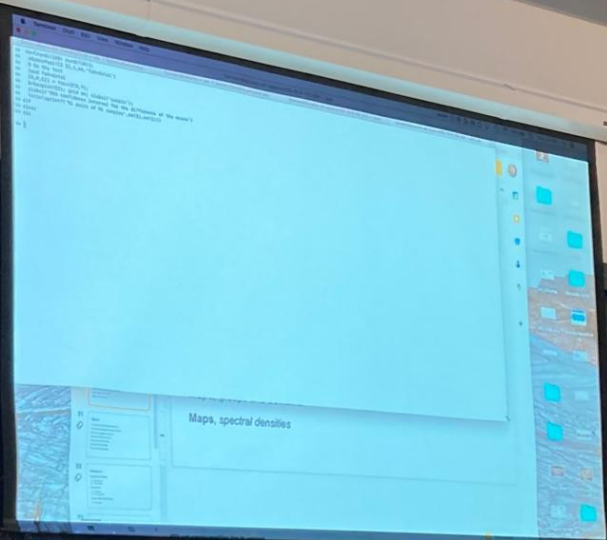
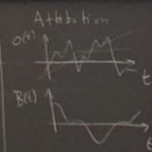
Guyot Hall (-74.65475°, 40.34585°) America/New-York time [HH:mm]

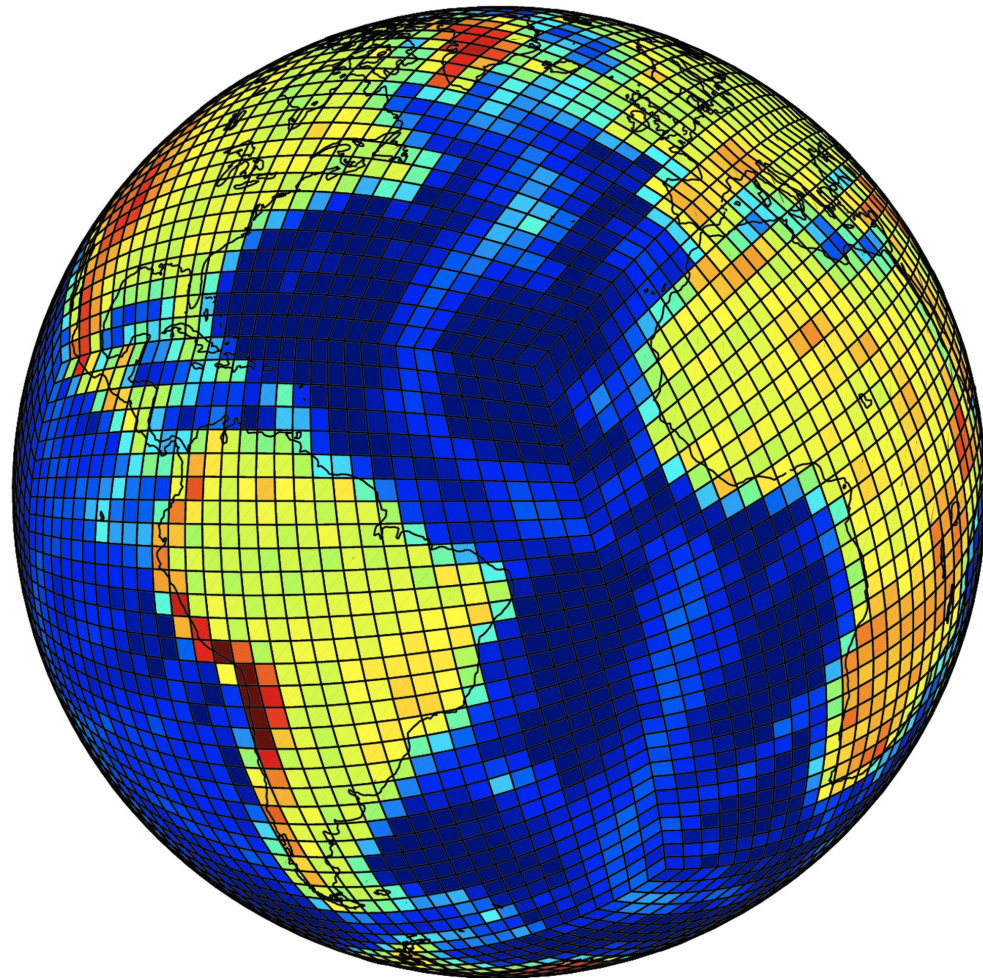
http://geoweb.princeton.edu/people/simons/PTON/pton0200.21__ASC_ASCIII.n.mrk

Field	Data type	Model
Physics	$\underline{r}(t)$	pendulum, rotation
Meteorology	Temperature	average over year
Oceanography	Height	
Biology	Photosynthesis Neural circadian	Tidal flow predation

Economics

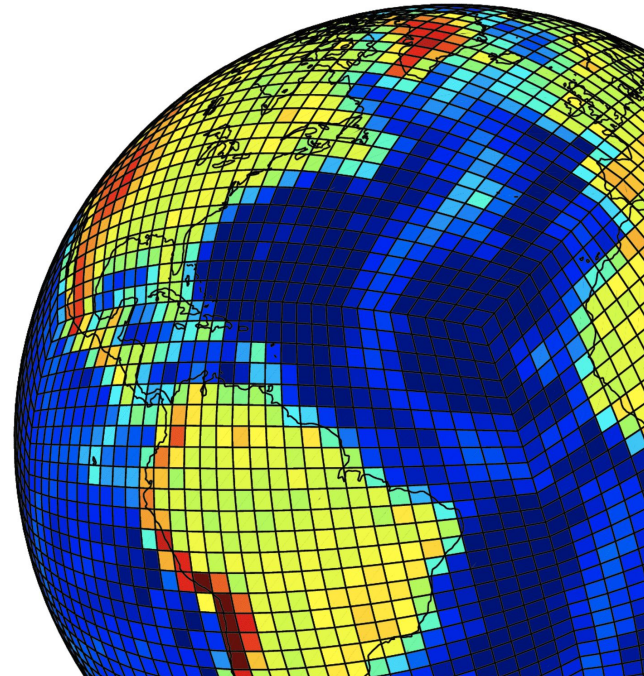
Business Cycles

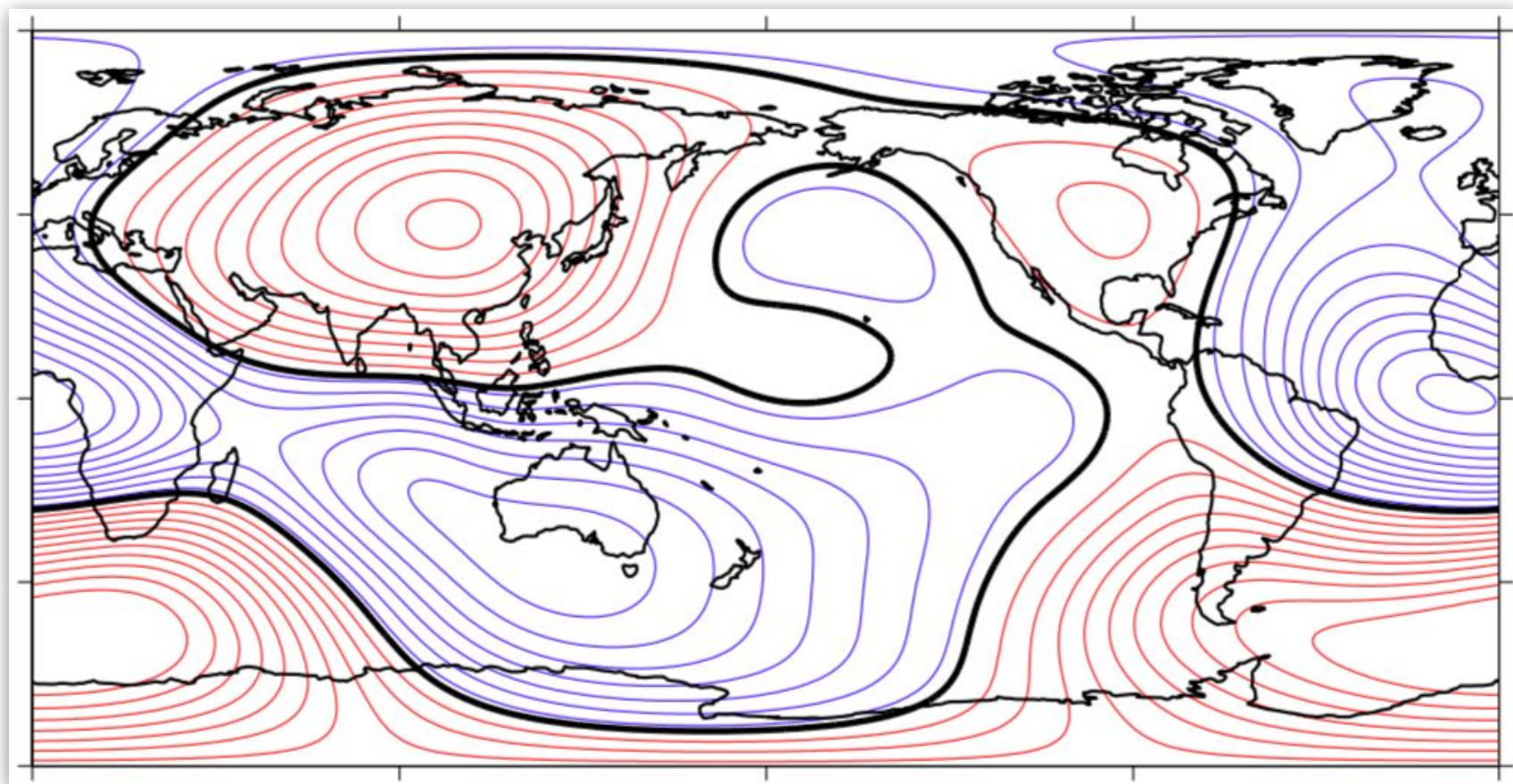




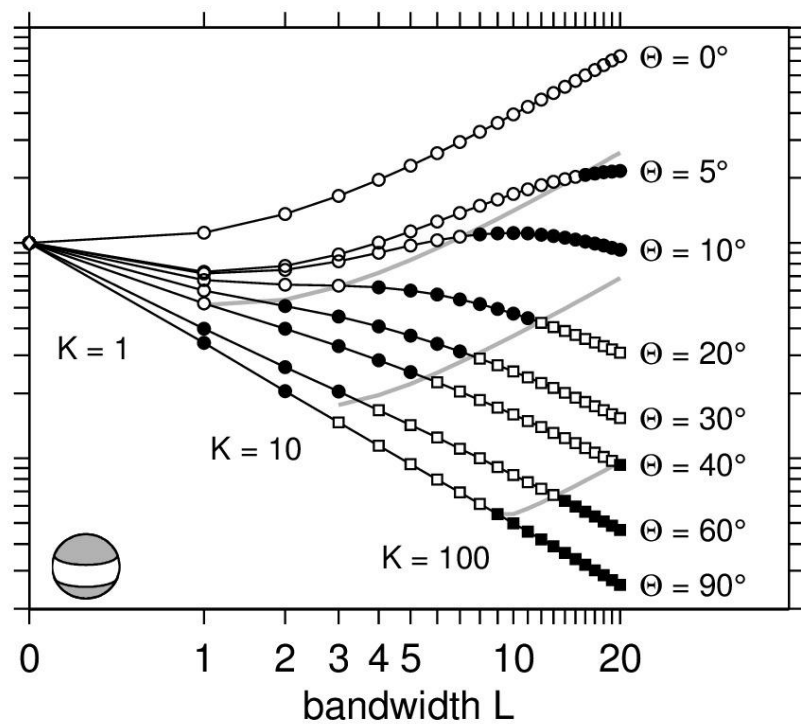
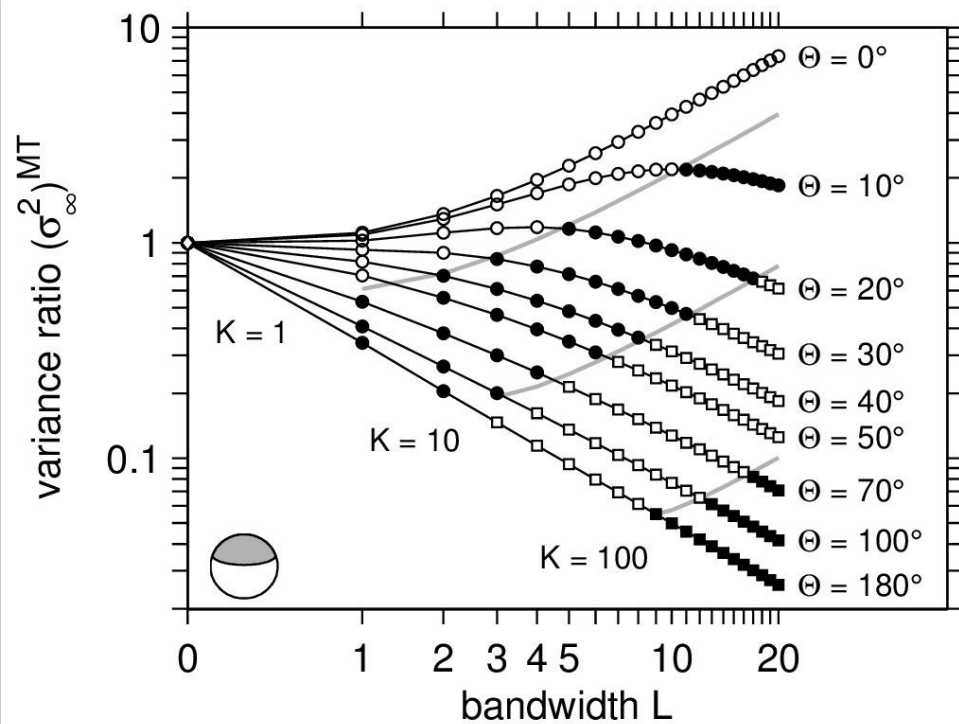
Making Your Figures Work for You, Using MATLAB

Frederik J Simons
Princeton University





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plot3 	scatter3 	histogram2 	barh 	geoscatter 	polarhistogram 	contourf 	quiver3 	surfc 	streamslice 	comet 	imagesc 
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semilogx 		wordcloud 	stairs 					mesh 			
semilogy 		bubblecloud 						meshc 			
fplot 		heatmap 						meshz 			
fplot3 		parallelplot 						waterfall 			
fimplicit 		plotmatrix 						fmesh 			



$N = 7$
 $L = 256$

