

B2 • Discussion #1 • 2021-01-29

Make sure you are in the correct discussion! There are two right now

Nice to meet you!

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Announcements

don't private message via BB either!

- Questions? Do not email Prof. Attaway. Ask on the Chat Discussion Forum on Blackboard! (You can email us though if you're uncomfortable)
- MATLAB Grader: problems due in 2 days (so Monday problems due Wed, Wednesday problems due Fri.) by 10 am EST (UTC -5h)
- Gradescope has been set up and we will use today for a practice "quiz" (really just an upload)
 - find it in BB under "Homework, Quizzes, Exams, Project"
- TA Open Hours are posted
 - Sunday 11 am - 1 pm ← Leah
 - 7 pm - 9 pm ← Charles
 - Tuesday 7 pm - 9 pm ← Charles + Leah
 - Thursday 11 am - 1 pm
 - 7 pm - 9 pm ← Leah
- Make note of the meeting ID's just in case BB is down. Passcode is Matlab
- Note that we do not always cover an entire chapter for each class... sometimes it's just a section (no need to guess, just see syllabus!)

Syllabus, Course Info, + Weekly Rhythm → lab worksheets + Grader due 2 days later (10am)

- Lecture: 5 min IPP on BB, then join zoom meeting to work on GPP (these are not collected), and do not use MATLAB during lecture (only Labs)
- Course Material: all material is in the book and the lecture videos + slides are supplemental (takeaway: read what's assigned!)
- Exams + quizzes: make note of all of these dates and get them on [4:30pm] your calendars asap!

Review Lecture Material (+ Mock Quiz @ 10:50 am)

- We'll go over sequential problems and what they mean!

rand() — random real # between 0 and 1, noninclusive

*rand < 1

logical 1

example of generating a random real # between min + max

$$\text{rand} * (\max - \min) + \min$$

linspace() — creates linearly spaced values; takes 3 arguments but if only provide 2, it defaults to 100 linearly spaced pts.

* linspace(1, 3, 5)

1 1.5 2 2.5 3

EQUATION! spacing for linspace:

$$(x_2 - x_1)/(n-1)$$

* linspace(9, 5, 3)

$$\frac{(5-9)}{(3-1)} \Rightarrow -4/2 \Rightarrow -2$$

9 7 5

$$\begin{matrix} \uparrow & \uparrow & \uparrow \\ 2^{\text{nd}} \text{ arg} & 1^{\text{st}} \text{ arg} & 3^{\text{rd}} \text{ arg} \end{matrix}$$

'a' < 'b'

| ... true because of the ASCII equivalents, 'a' is 97 ∴ 'b' is 98, and so forth

10 > 5 > 2

0 ... because first $10 > 5$ is true so ① but then we evaluate $1 > 2$ which is false so 0!

Example of a sequential problem:

v = 1:5

1 2 3 4 5

v(2:4) = 7:9

1 7 8 9 5 (... replaces the middle 3 elements!)

When to use length vs. size?

→ use `length()` for vectors

→ use `size()` for matrices

- can also use `size()` for vectors to determine if a row or column vector

isequal() vs. == ?

vec1 = 1:3

vec2 = [1 0 3]

isequal(vec1, vec2)

0

vec1 == vec2

1 0 1

scalar multiplication

[5 3 0] * 5

25 15 0

logical indexing vs. using find()

vect = randi([-5, 10], 1, 6)

... let's say this gives us -5 8 9 5 7 6

`vect(vect > 0)`

`vect =`

8 9 5 7 6 ← gives the actual values that are > 0 in order

`find(vect > 0)`

`ans =`

2 3 4 5 6 ← returns the indices of values > 0

Array Multiplication

Given the following matrices (arrays):

$$A = \begin{bmatrix} 1 & 4 \\ 3 & 2 \end{bmatrix} \quad B = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 5 & 6 \\ 3 & 6 & 0 \end{bmatrix} \quad C = \begin{bmatrix} 3 & 2 & 5 \\ 4 & 1 & 2 \end{bmatrix}$$

2x2 3x3 2x3

$$3 * A$$

$$\begin{bmatrix} 3 & 12 \\ 9 & 6 \end{bmatrix}$$

$$A * C$$

Let's work this out step-by-step:

$$\begin{bmatrix} 1 & 4 \\ 3 & 2 \end{bmatrix} \begin{bmatrix} 3 & 2 & 5 \\ 4 & 1 & 2 \end{bmatrix}$$

2x2 dimension 2x3

inner dimensions
match, so valid!

$$\begin{bmatrix} 1 \times 3 + 4 \times 4 & 1 \times 2 + 4 \times 1 & 1 \times 5 + 4 \times 2 \\ 3 \times 3 + 2 \times 4 & 3 \times 2 + 2 \times 1 & 3 \times 5 + 2 \times 2 \end{bmatrix}$$

$$\begin{bmatrix} 19 & 6 & 13 \\ 17 & 8 & 19 \end{bmatrix}$$

... note that it's 2×3 ! (the outer dimensions of the matrices)

→ also $C * A$ does not work. Why?

Element by element multiplication

$$D = \begin{bmatrix} 5 & 6 \\ 7 & 8 \end{bmatrix} \quad E = \begin{bmatrix} 0 & 1 \\ 2 & 3 \end{bmatrix}$$

$D . * E$ ← need the dot/period before!

step-by-step we get:

$$\begin{bmatrix} \underline{\underline{5 \times 0}} & \underline{\underline{6 \times 1}} \\ \underline{\underline{7 \times 2}} & \underline{\underline{8 \times 3}} \end{bmatrix}$$

$$\begin{bmatrix} 0 & 6 \\ 14 & 24 \end{bmatrix}$$

Problem Solving

SO MANY TENNIS BARS!

MOCK Quiz

Go to BB → Homework, Quizzes, Exams, Project → GradeScope

How to edit a PDF?

→ Adobe Acrobat

→ Tablets with Stylus

→ old fashioned pen + paper! (take a picture on your smartphone using an app like AdobeScan to make a PDF if you don't have a scanner)