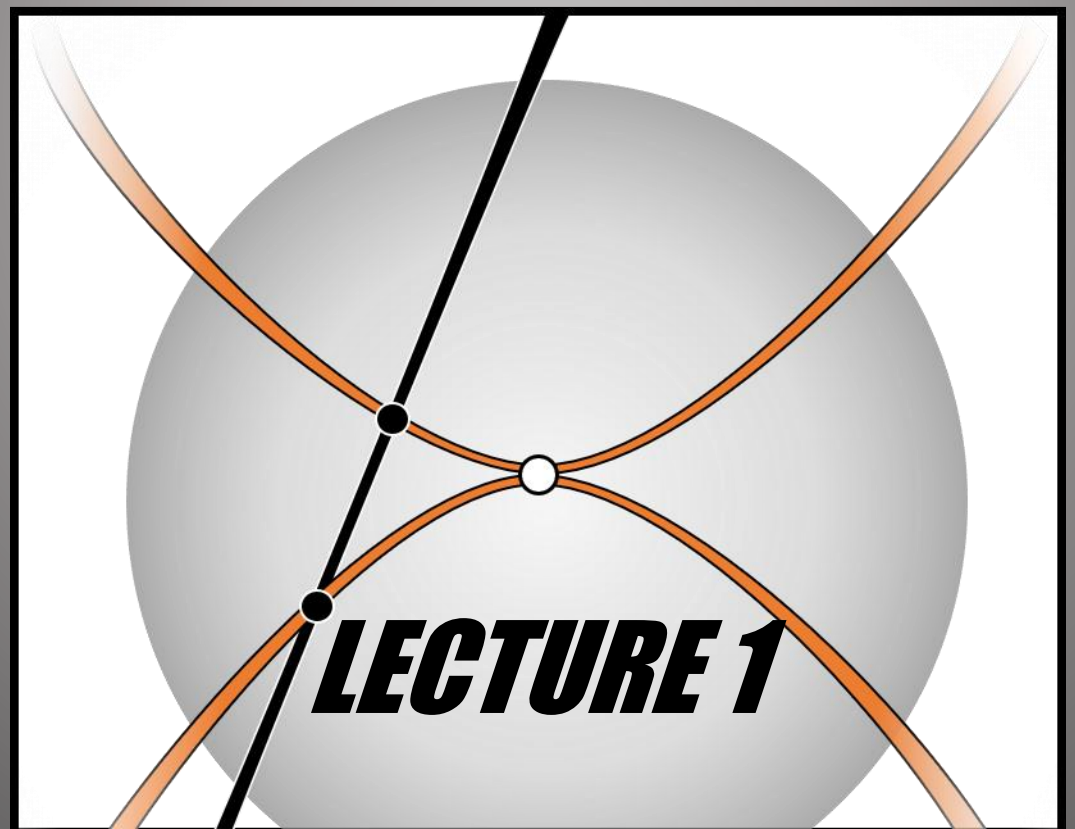
COMPUTATIONAL MATHEMATICS

Vidit Nanda
nanda@maths.ox.ac.uk



OUTLINE

Matlab

Demonstrations

Installation

Assessment

Help!

Mathematicians need – and use! – computers for various important tasks, such as:

Performing complicated **computations**: *what is* log*(3.5689)*/sin*(2.33)?*
Looking up **references**: *what is the Hahn-Banach theorem?*
Visualizing (low-dimensional) geometry: *does this function have an asymptote?*
Developing and using **algorithms**: *do these equations have a solution?*
Plus *dank memes*, *cat videos*, *fortnite*, *twitter* (`@viditnanda`),…

Matlab is an integrated environment which helps with some of these tasks: it is a *calculator*, a *graphing environment*, and a *programming language* all at once.

At its core, Matlab is designed for numerical computing and linear algebra; with additional *toolboxes*, such as the **Symbolic Math Toolbox** (MuPAD), it acquires other abilities (e.g., manipulating algebraic expressions without numerical evaluation).

There is a **manual** containing what you should know, including exercises, etc.
Pick up your copy from the reception desk! It will help to have a printout.

DEMONSTRATIONS

There will be practical 2-hour sessions this term to familiarise you with Matlab. These may begin next week for some of you --- ask your **college tutor** for details!

The lead demonstrator is **Joe Field** (fieldj@maths.ox.ac.uk) and you must get in touch with him if you are unable to attend your regular session(s) for any reason.

The *most important thing* for your first session is to **bring a charged laptop with Matlab Already installed** if possible. If you can't arrange for a laptop, please *get in touch with Nia Roderick* (acadadmin@maths.ox.ac.uk), and *bring a USB drive* instead.

You should also have the **Matlab manual** with you; switching between Matlab and the Manual on your screen will be a pain, so I'd suggest picking up that printed copy from the Reception Desk.

Demonstrators may assign problem sheets; bring your solutions in hardcopy using the **publish** command (more on that in your first session!)

INSTALLATION

Matlab is a substantial piece of software, so downloading and installing it can **take several hours** even with a good internet connection!

On top of that, there is a *registration* step where at some point during the installation you will require a mysterious incantation called Oxford's **site license** code.

All this (Matlab download file plus site license) can be found on the website here:

https://register.it.ox.ac.uk/self/software

This requires knowing your **Single Sign On** username (*blah1234*) and password, but it should work, fingers crossed, across Windows, Mac and Linux.

If you encounter any difficulty with this process, **please inform your college's IT Wizards** and ask them for help…

… and again: if you don't have a functioning laptop, please contact Nia Roderick, and come to the demonstration anyway with a USB drive!

✓ ASSESSMENT

The assignments from demonstration sessions this term *will not be formally assessed,*

BUT...

This does not mean that you shouldn't attempt these exercises! The more your learn this term, the easier your life will be next term,

BECAUSE...

Next term you will be assigned two (out of three) **Matlab projects**, which are to be done independently!

AND...

Not only will these projects be formally marked, but those **marks will count towards your Prelims**.

HELP

For questions about how something in Matlab works, you should **consult the Manual**, or your **college tutor**

Personally, I tend to type `help` in the main Matlab window, e.g., `help plot`, or just Google `[plot 2d function matlab]`.

For administrative matters pertaining to this course, please consult Nia Roderick by emailing `acadadmin@maths.ox.ac.uk`

For help with the practical sessions, email your demonstrator, or the lead demonstrator Joe Field `fieldj@maths.ox.ac.uk`

For lecture notes, projects, etc., there is a course website:

`https://courses.maths.ox.ac.uk/node/43979`

In the event of the apocalypse (or an equivalent catastrophe), you can also email me: `nanda@maths.ox.ac.uk`