

# Movies and Data with Matlab

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# Outline

- Creating and Exporting movies
- Tricks for saving large amounts of data
- Embedding movies in powerpoint or html
- Using Flash

# Capturing a Frame

Initialize the movie into memory

```
movClip = moviein(numFrames);
```

```
for i=1:numFrames;
```

```
    plotCommand
```

```
    movClip(i)=getframe;
```

```
**or**    movClip(i)=getframe(gcf);
```

```
end
```

```
movie(movClip)
```

make your plot as desired

Save a frame for the movie, this only captures the actual graph

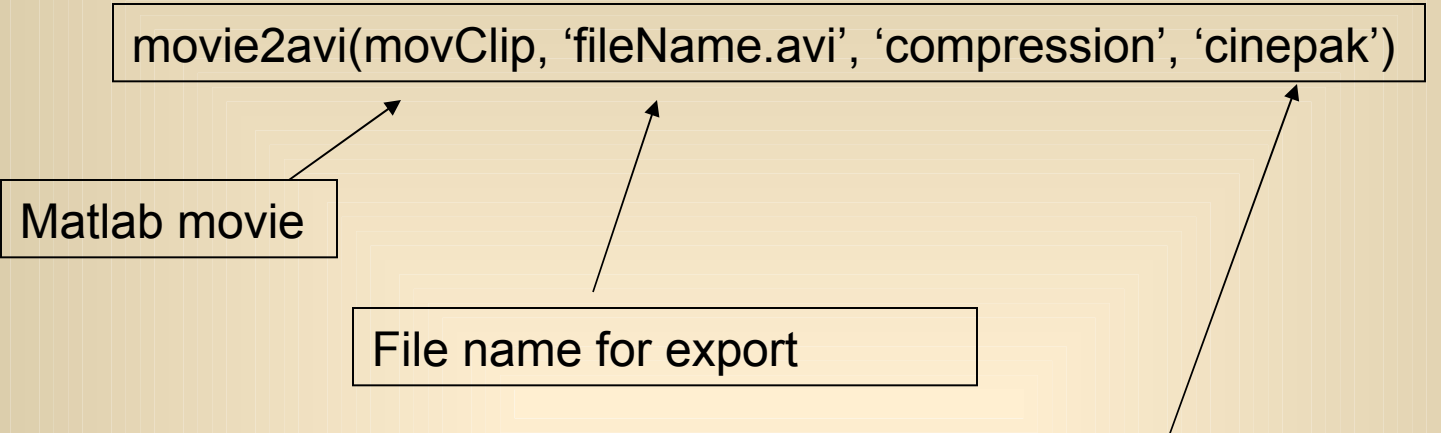
(or) capture a frame including the axes and a grey background

Play your movie

# Exporting the Movie

```
movie2avi(movClip, 'fileName.avi', 'compression', 'cinepak')
```

Matlab movie



File name for export

Compression profile:

'Cinepak' or 'indeo5' for windows (5 megabytes)

'none' for unix (250 megabytes)

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Can also specify the frame rate:

```
movie2avi(movClip, 'fileName.avi', 'compression', 'indeo5', 'fps', 15)
```

# Data Saving Tricks

- Use `fopen()`, `fwrite()`, `fclose()` to save data from simulations
- Get rid of excess information by changing data type from *float64* to *bitn*
- Create a script to open data files and plot them to create a movie and export
- Be careful on the size of files and number of files per directory:
  - 4 KB minimum in Windows (NTFS cluster size), <10,000 per directory (or crash/slow windows), similar in Unix
  - Group data into larger files and multiple directories

# Data Saving Tricks

For example:

$U[i] = (x1, x2, y1, y2, b, u)$  for  $i=1:\text{numSteps}(\text{large\#})$

Where  $x1, x2, y1, y2$  are random grid coordinates say...  
128x128,  $b = 0$  or  $1$ , and  $u$  is a random number

- \* I can save the grid coordinates as bit7 since they are 0:127
- \*  $b$  can be saved as 1 bit.
- \*  $u$  can be saved as float64 (or maybe float32 depending on what resolution I want).

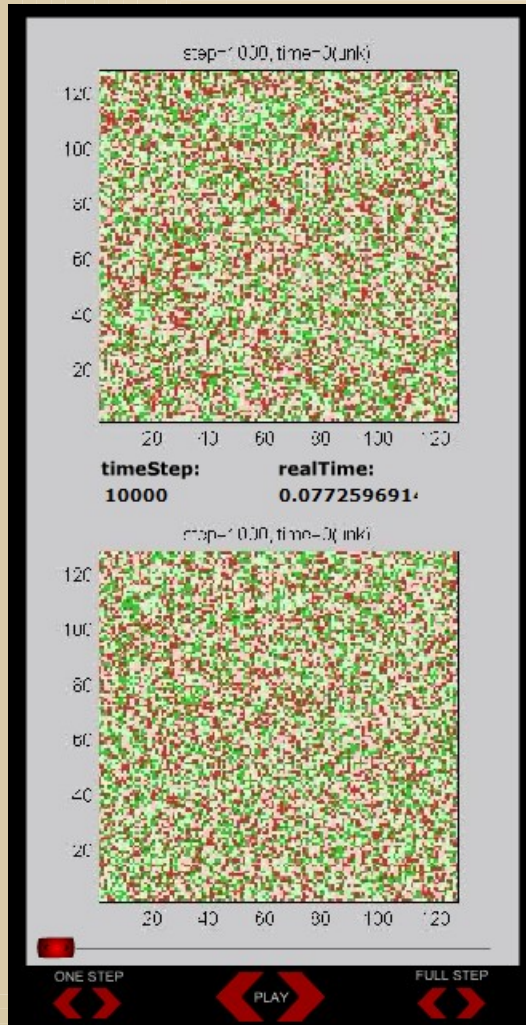
This leads to 93 bits per step, rather than  $64 \times 6 = 384$  bits!

Over 75% savings! Of course it depends on case specifics.

# Flash

- Use flash to embed movies in webpages or powerpoint.
  - Add extra interactivity
  - High compression
  - No funny business or problems with seeing movies on the screen

# Flash Example



Single frame step

Play: reverse or forward

Slider control

Skip to end, or rewind

Done with action-scripting, similar to matlab scripts, except with inclusion of timeline and layers

# Flash Example

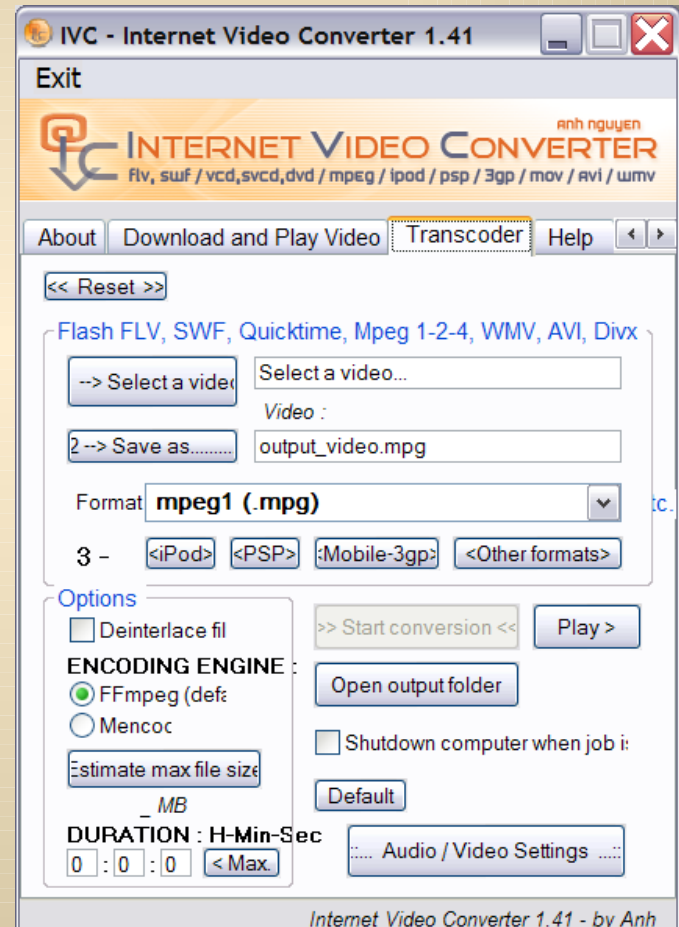
- This example was:
  - 90MB compressed with indeo5
  - 8.4MB compressed with AutoGK
  - 9.1MB with flash(including interactivity)
- 2 separate movies merged together due to memory using “VirtualDub”

# Embedding flash in HTML

```
<object width="300" height="600">  
  <param name="movie" value="16x16Model2.swf">  
    <embed src="16x16Model2.swf" width="300" height="600">  
  </embed>  
</object>
```

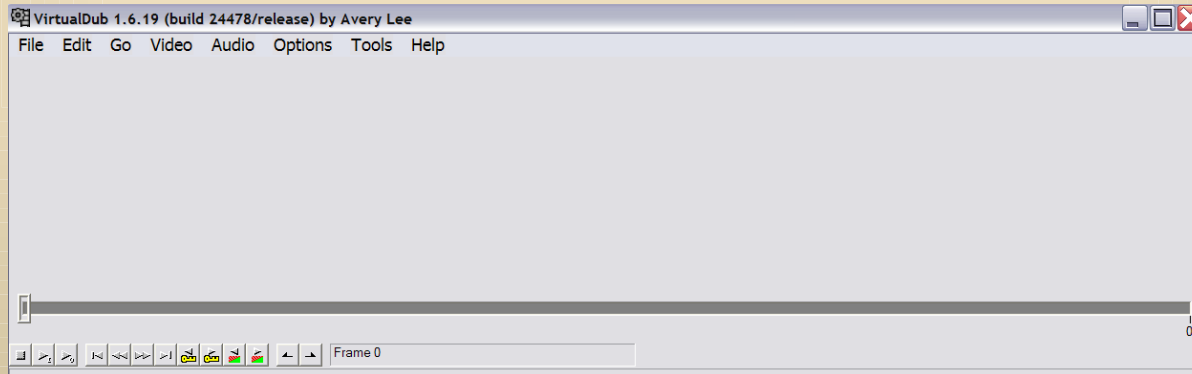
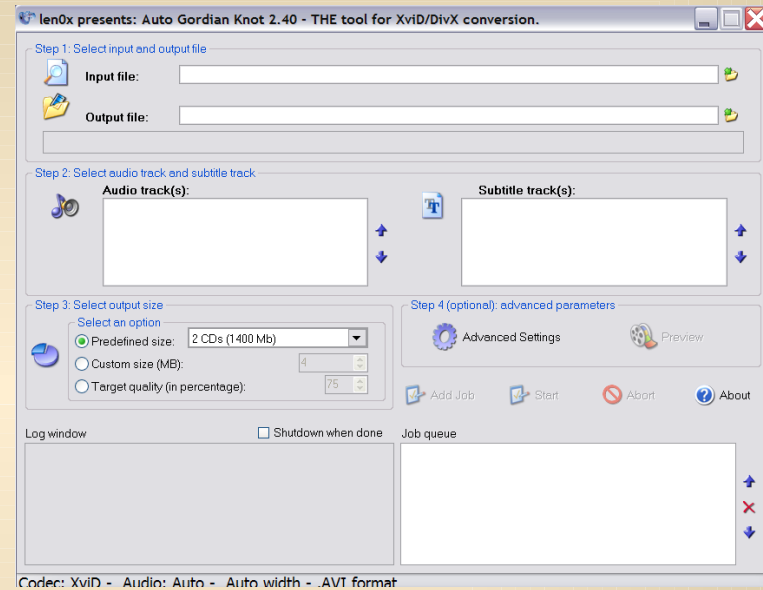
# On your phone?

- Use IVC – “Internet Video Converter” to compress for your phone, an easy way to show your work
- Compresses to 3gp, mpeg, avi, and many other formats



# AutoGK & VirtualDub

- Free program “Auto Gordian Knot”
- Compresses movies
- Merges clips



# Conclusion

- Any questions?