



University **2020**  
**REPORT**

# Matlab编程入门简介

■ 潘晓声

■ 2020/06/20



## CONTENTS



Science & Research Unit  
上海市科研领域大数据联合创新实验室

- 1** • Matlab优势与劣势
- 2** • Matlab的工具箱介绍
- 3** • 简单的语法与GUI编程



/01

---

- Matlab优势与劣势

# Matlab优势与劣势

- 优势

- 资源丰富
- 语法简单
- 科学计算性能优，矩阵算法速度特别快
- 开发周期短
- 系统集成好
- GUI界面
- 更新稳定
- 有对应的免费版本octave
- 跨平台
- 可以编译成独立可执行的程序

- 劣势

- 深度学习 VS python
- 数理统计 VS R
- 运行速度 VC C



/02

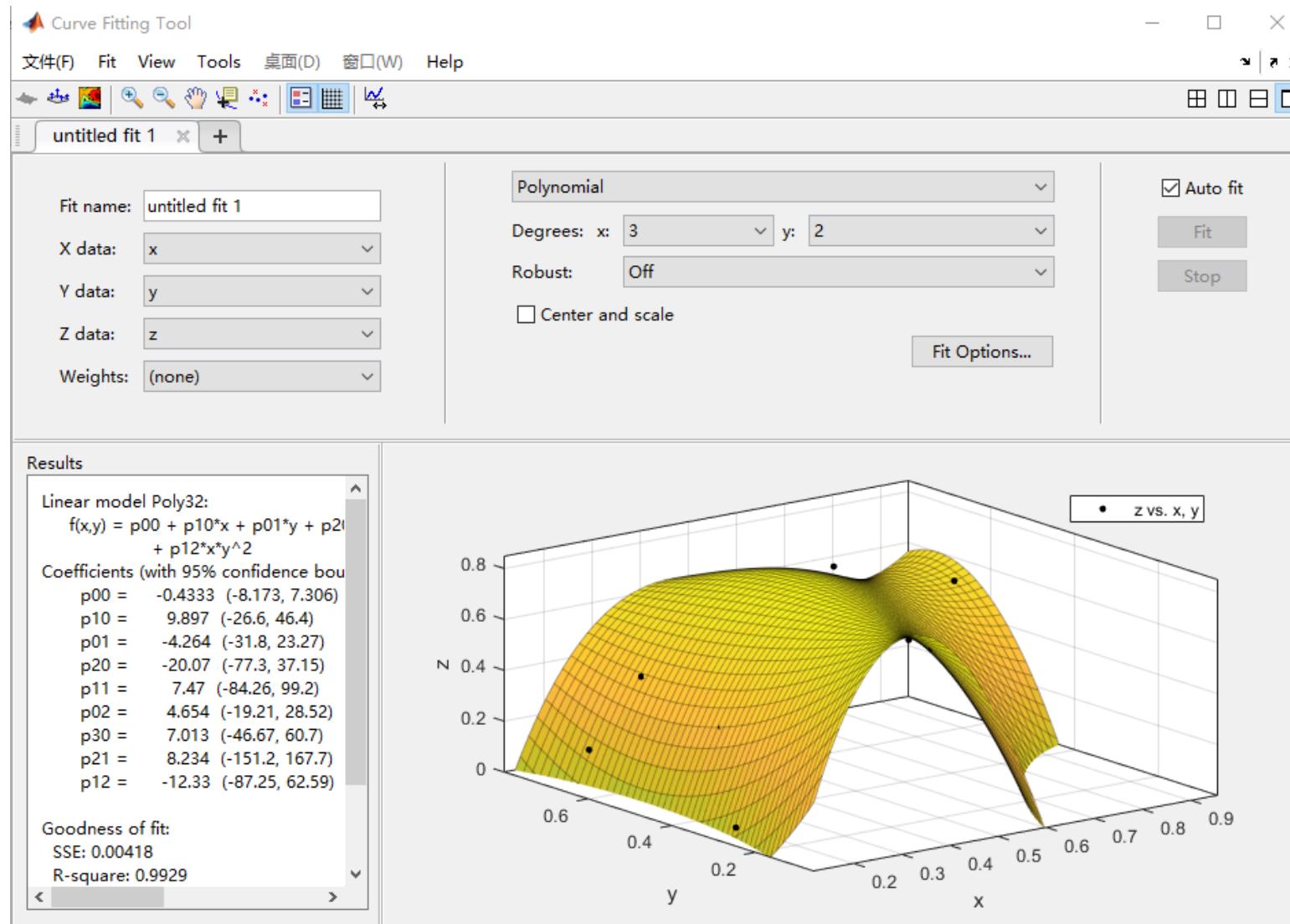
---

- Matlab的工具箱介绍

# Matlab的工具箱介绍

Antenna Toolbox	Powertrain Blockset
Audio Toolbox	Predictive Maintenance Toolbox
Automated Driving Toolbox	Reinforcement Learning Toolbox
<u>AUTOSAR Blockset</u>	RF Blockset
Bioinformatics Toolbox	RF Toolbox
Communications Toolbox	Risk Management Toolbox
Computer Vision Toolbox	RoadRunner
Control System Toolbox	RoadRunner Asset Library
Curve Fitting Toolbox	Robotics System Toolbox
Data Acquisition Toolbox	Robust Control Toolbox
Database Toolbox	ROS Toolbox
Datafeed Toolbox	Sensor Fusion and Tracking Toolbox
Deep Learning Toolbox	SerDes Toolbox
DO Qualification Kit ( <i>for DO-178</i> )	Signal Processing Toolbox
DSP System Toolbox	SimBiology
Econometrics Toolbox	SimEvents
Embedded Coder	Simscape
Filter Design HDL Coder	Simscape Driveline
Financial Instruments Toolbox	Simscape Electrical

# Matlab的工具箱介绍 cftool



# Matlab的工具箱介绍 waveletAnalyzer

<b>One-Dimensional</b>	<b>Specialized Tools 1-D</b>
Wavelet 1-D	SWT Denoising 1-D
Wavelet Packet 1-D	Density Estimation 1-D
Continuous Wavelet 1-D	Regression Estimation 1-D
Complex Continuous Wavelet 1-D	Wavelet Coefficients Selection 1-D
Continuous Wavelet 1-D (Using FFT)	Fractional Brownian Generation 1-D
<b>Two-Dimensional</b>	Matching Pursuit 1-D
Wavelet 2-D	
Wavelet Packet 2-D	
Continuous Wavelet Transform 2-D	
<b>Three-Dimensional</b>	<b>Specialized Tools 2-D</b>
Wavelet 3-D	True Compression 2-D
	SWT Denoising 2-D
	Wavelet Coefficients Selection 2-D
	Image Fusion
<b>Multiple 1-D</b>	<b>Display</b>
Multisignal Analysis 1-D	Wavelet Display
Multivariate Denoising	Wavelet Packet Display
Multiscale Princ. Comp. Analysis	
<b>Wavelet Design</b>	<b>Extension</b>
New Wavelet for CWT	Signal Extension
	Image Extension



/03

---

• 简单的语法与GUI编程

# Matlab常用语法

； : , % = ==

clear clc

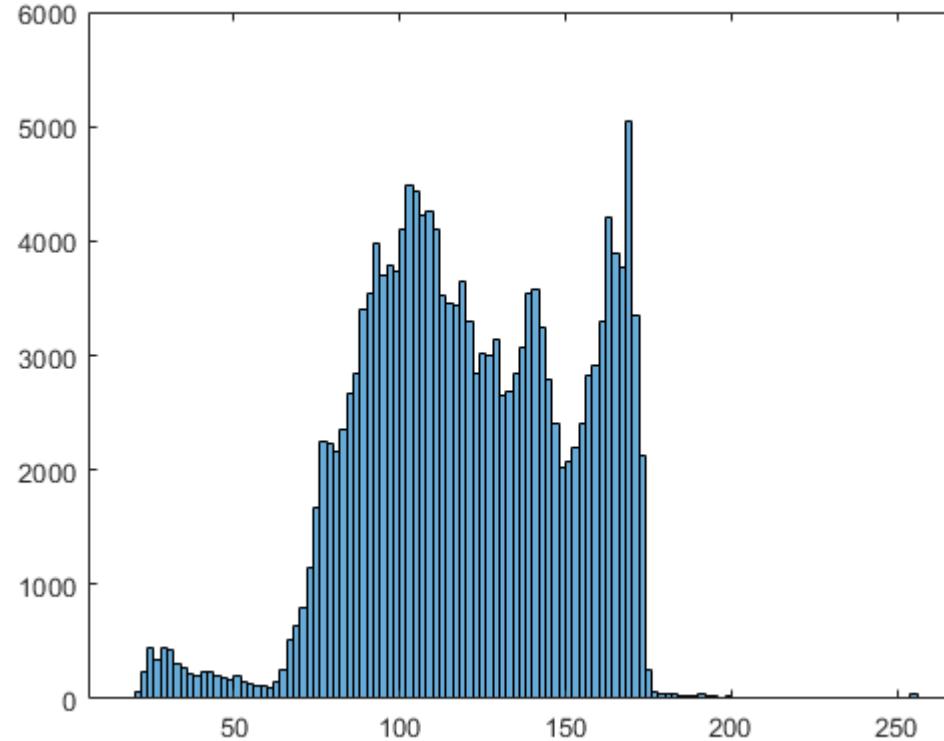
```
for i = 1:10  
end
```

```
if a==1  
    do sth  
elseif a==2  
    do sth1  
else  
    do sth2  
end
```

```
function [para,para1] = name(para1,para2,para3)
```

# 去除迷雾

- 读取图片
- `I = imread('文件名');`
- I 的格式
- 显示图片 `imshow`
- 显示直方图 `histogram`
- 直方图均衡`histeq`



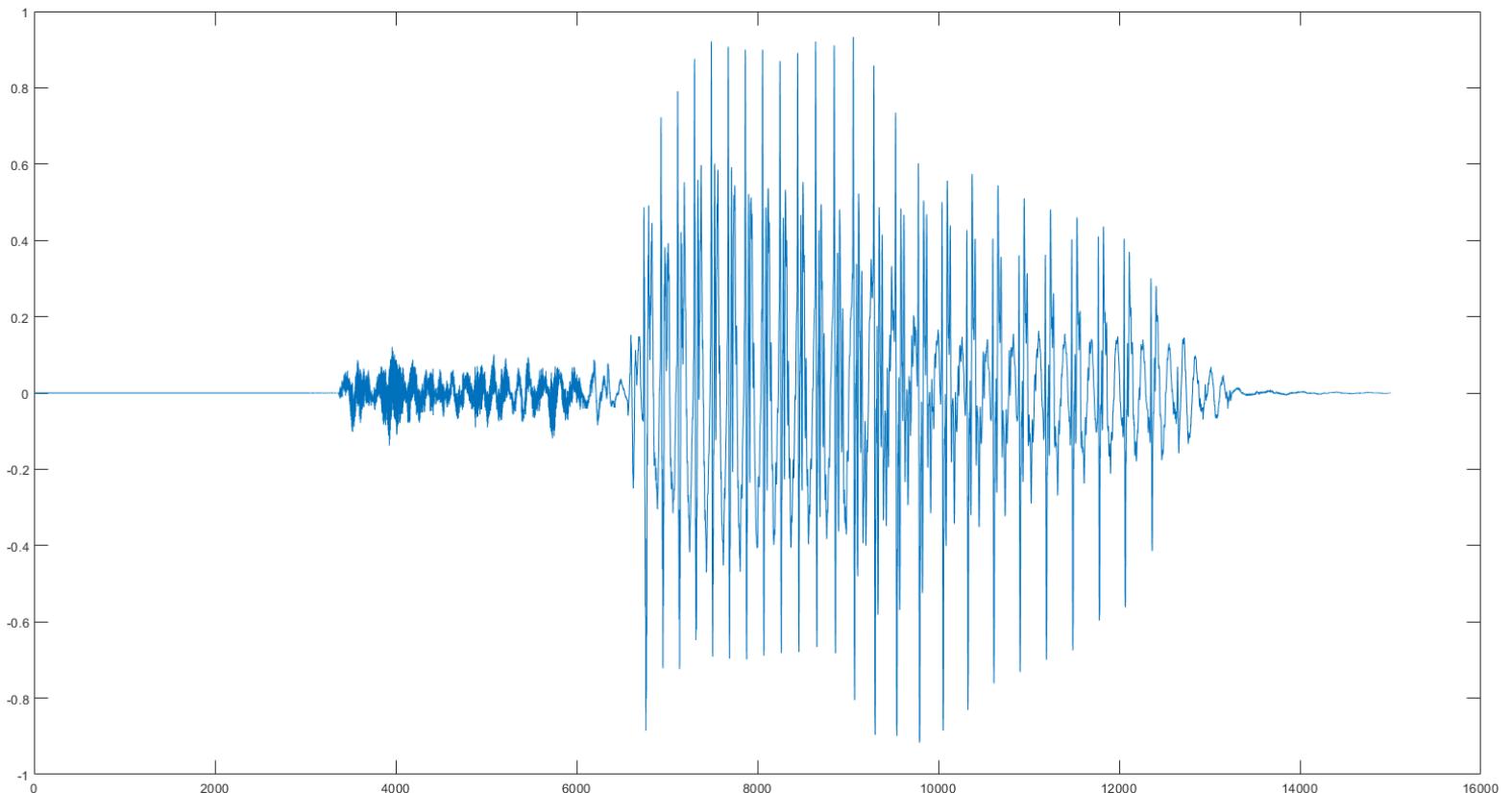
# 检测车灯

- 车灯的属性



# 最简单的变声器

- 语音的本质
- `[sp, fs] = audioread('文件名')`
- `h = audioplayer(sp,fs)`
- `play(h)`
- `audiowrite(sp,fs)`



# 无中生有

---

- 生成一段静音
- $\text{silent} = \text{zeros}(n,m)$
- 看一下，听一下
- 见证奇迹

# GUI编程

---

- 数据保存
- `guidata(hObject, handles);`
- 生成可执行文件
- `deploytool`



Thanks  
谢谢各位



復旦大學 大數據研究院  
人文社会科学数据研究所  
Institute for Humanities and Social Science Data