Octave basics

R Sri Prakash

Department of Electrical Engineering
Indian Institute of Technology Bombay

Introduction

- Command prompt
- Editor
- Current directory
- Workspace

Initialization of a matrix, vector

- Initialization
  - A= [a_{11} , a_{12} ; a_{21} , a_{22}];
    - ; used to separate rows
    - , used to separate columns
  - A=1:2:10;
  - A= linspace(i,j,N) —> linearly spaced N points between i, j
  - A= logspace(i,j,N) —> logarithmically spaced N points between i, j
- Indexing
  - A(i,j) represents element of i^{th} row, j^{th} column
  - A(i,:) represents elements of i^{th} row, all columns

Special matrices

- ones - all ones matrix
- zeros - all zeros matrix
- rand - all elements are uniformly random between 0,1
- randi - random integers matrix
- eye - identity matrix

General functions

- clc - clear screen
- close all - closes the windows
- pwd - present working directory
- size - size of matrix
- length - length of vector

Work space variables

- who, whos - workspace variables
- clear - clear the variables from workspace
- save - save workspace variables
- load - load variables to workspace

Matrix operations

- A+B, A-B, A*B, A^n
- Element wise operations .+, .-, .*, ./, .^
- A' - transpose of A
- A(:) - matrix to a vector
- $[A, B]$, $[A; B]$

Functions on matrices

- sum - sum of the elements in columns
- mean - mean or average of the elements in column
- max - finds max of the elements in columns
- min - finds min of the elements in columns
- sort - sort the elements in a
- ismember - checks if given element is present in matrix or not
- find - used to search the elements of a matrix

Conditional statements, loops, functions

- Conditional Statements
  - If (condition)
    statement 1
    statement 2 $\cdots$
    end
  - switch varName
    case {}
    statements
    otherwise
    statements
    end
- Loops
  - for i=1:n
    statement 1
    statement 2 $\cdots$
    end
  - while (condition)
    statement 1
    statement 2 $\cdots$
    end
- function
  - function [a,b] = functionName (x,y)
    statement 1
    statement 2 $\cdots$
    end

Figures, Plots

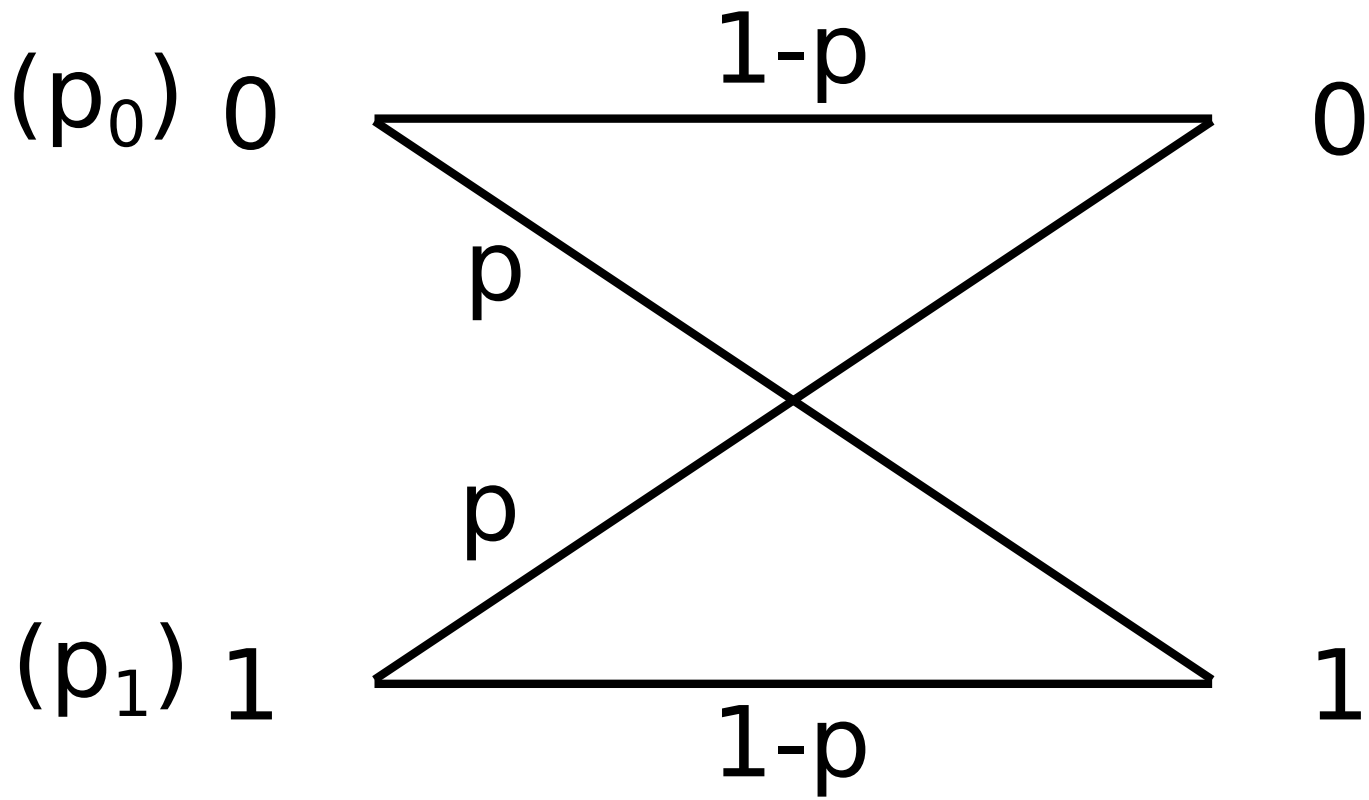
- Figure
- plot
- legend
- xlabel, ylabel
- title
- grid
- hold
- saveas[1]

[1] To save in eps color format use epsc in format specifier

Solving equations

- Ax=b -> A\b
- Polynomials -> roots(p)
- Arbitrary function -> fzero or fsolve
  - Create a file and write the function in it.
  - Use fsolve or fzero function

Modeling Binary Symmetric Channel (BSC)



Thank you

Appendix

- Package installation[2]: pkg install <file name of package>
- Loading the package: pkg load <package name>

[2] This should be run in command window of Octave