



Learning MATLAB and its Applications for Signal Processing & Communications

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Learning MATLAB & its Applications — Lecture no. 2

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Overview

1 Vectors & Matrices Addressing

- Vectors
- Matrices
- Matrix Operations
- Built-in Functions for Handling Arrays

2 Conclusions

References:

- [1] Desmond J. Higham and Nicholas J. Higham, MATLAB Guide, 2nd ed. Society for Industrial and Applied Mathematics, 2005.
- [2] Amos Gilat, MATLAB An Introduction with Applications. John Wiley & Sons Inc., 2004.

Some Elementary Vector Addressing

Operation	Command	Outcome
<i>Zeroing</i>	<code>a(2:4)=0;</code>	zeroing the entries 2, 3 and 4 of a vector a
<i>Deleting</i>	<code>a(2)=[];</code>	removes or deletes the 2nd entry of a vector a ; the size of a will change
<i>Adding</i>	<code>a(3)=a(3)+5;</code>	adds 5 to the 3rd entry of vector a
~	<code>a(3)=a(3)+a(2);</code>	adds the 2nd entry of vector a to its 3rd entry
<i>Accessing</i>	<code>a(2:5);</code>	accessing the 2nd to the 5th entry of vector a
<i>Logic's</i>	<code>a>.5;</code>	returns one in the position that a >.5 and 0 otherwise
~	<code>a(a>.5);</code>	finds the entries of a that satisfies the condition, i.e., a > .5
~	<code>a(a>.5 & <.7);</code>	finds the entries of a that satisfies the two conditions
~	<code>find(a<.1);</code>	returns the position of a that satisfies the condition
~	<code>a(find(a<.1));</code>	returns the entries of a that satisfies the condition

Some Elementary Matrix Addressing

Oper.	Command	Outcome
<i>Zeroing</i>	<code>a(2:4,[1 3 6])=0;</code>	zeroing the block of rows 2-4 and columns 1, 3, 6 of a matrix a
<i>Deleting</i>	<code>a(2:2:6,:)=[];</code>	removes or deletes rows 2, 4, and 6 of a matrix a ; the size of a will change
<i>Adding</i>	<code>a(:,3)=a(:,3)+5;</code>	adds 5 to the 3rd column of matrix a
~	<code>a(2,:)=a(2,:)+a(4,:);</code>	adds the 4th row of matrix a to its 2nd row
~	<code>a(:,3)=a(:,3)+a(:,1)+a(:,2);</code>	adds columns 1 and 2 to the 3rd column of matrix a
~	<code>sum(a,1)</code>	adds all rows of matrix a in one row
~	<code>sum(a,2)</code>	adds all columns of matrix a in one column
~	<code>sum(sum(a));</code>	returns the sum of all entries of matrix a

Simple Matrix Operations

```
3*a; a.*b; a*b; det(a); inv(a); pinv(a); a^-1;  
X=A^-1*B; X=A\B; mean(a); sort(a); median(a); min(a);  
[d,n]=min(a); max(a); [d,n]=max(a);
```



Miscellaneous

- `length(v)`,
- `size(A)`,
- `reshape(A,m,n)`,
- `diag(v)`,
- `diag(A)`



Conclusion

Concluding remarks

- Some elementary vector and matrix addressing are given
- Some examples and exercises are illustrated