Weekly Report(Mar.5,2018-Mar.18,2018)

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Abstract

In the past two weeks,I have learned the Week2 and Week3 courses of **Linear Algebra** and some syntax of the **C++** programming language.

1 Linear Algebra

The courses these weeks focus on **Linear Transfoemations and Matrices** and **Matrix-Vector Operations**.

1.1 Linear Transformations

The courses start by rotating in 2D which give us a visualized demonstration of linear transformation.Transforming a scaled vector is the same as scaling the transformed vector.

$$L(\alpha x) = \alpha L(x)$$

Transforming the sum of two vectors is the same as summing the transformed vectors.

$$L(x+y)=L(x)+L(y)$$

We can judge whether a transformation is linear one if the equation is right.
And we can generalize it as

$$L(\alpha_0 v_0+\alpha_1 v_1+...+\alpha_{k-1} v_{k-1})=\alpha_0 L(v_0)+\alpha_1 L(v_1)+...+\alpha_{k-1} L(v_{k-1}).$$

1.2 Mathemactical Induction

If we want to prove something holds for all members of a set that can be defined inductively,then we would use mathematical induction.We use it like this
(Base case)a property holds for $k=k_b$;and
(Inductive step)if it holds for k=K,where $K \geq k_b$,then it is also holds for k=K+1,
then one can conclude that the property holds for all integers $k \geq k_b$.Often $k_b=0$ or $k_b=1$.

1.3 Representing Linear Transformations as Matrices

We can apply linear transformation to matrice.$L(x)=Ax=\sum_{j=0}^{n-1} \chi_j a_j$.

1.4 Special Matrix

The Zero Matrix
The Identity Matrix
Diagonal Matrix
Triangular Matrices
Transpose Matrix
Symmetric Matrices

2 the C++ programming language

Some syntax of C++ is just like C,thus there is no need to list them redundantly.I'm liable to write down something new I have learned these weeks.

2.1 vector

The C++ offers a quite convenient way to produce a vector.We can define a vector like

vector ⟨type⟩ name(the number of elements)

2.2 cerr

cerr can be used to output the error.The difference between *cerr* and *cerr* is that *cerr* outputs after buffering while *cerr* outputs directly.

2.3 try-throw-catch

This syntax makes me confused.After searching for its usage a lot,I still can't use it.What should I write after *throw* and *catch*?

3 Plans for next two weeks

1.Learn the courses Week4,Week5,Week6 of **Linear Algebra**.
2.Keep on learning the **C++** programming language.
3.Use LaTex by myself more.