**Linear Algebra Midterm Project**

2021-12-06

■ There are two iterative methods to estimate an eigenvalue. One is the power method for estimating a strictly dominant eigenvalue. The other is the inverse power method for estimating an eigenvalue with roughly estimated eigenvalues. The iterative process of these two methods are described as below.

텍스트이(가) 표시된 사진

자동 생성된 설명

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자동 생성된 설명

1. (15pt) Estimate a strictly dominant eigenvalue of a matrix with initial vector described as following.

Q1.1. What kind of method do you choose? Explain the reason of your selection.

Q1.2. Write a code to estimate a strictly dominant eigenvalue of A with initial vector .

Q1.3. Fill in the blanks in the table below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Iteration | 1 | 2 | 3 | 4 | 5 |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

2. (15pt) Estimating an eigenvalue , which are the two smallest eigenvalues of with initial vector described as following.

with roughly estimated eigenvalues 21, 3.3, and 1.9

Q2.1. What kind of method do you choose? Explain the reason of your selection.

Q2.2. Write a code to estimate the two smallest eigenvalues of with initial vector .

Q2.3. Draw two tables to estimate the two smallest eigenvalues of with initial vector .

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Iteration | 0 | 1 | 2 | 3 | 4 |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

■ RANSAC(RANdom Sample Consensus) is an iterative method to estimate parameters of a mathematical model from a set of observed data that contains outliers, when outliers are to be accorded no influence on the values of the estimates.

3. (20pt) There are 100 points in in data.txt. We want to estimate a line .

Q3.1. Explain your strategy to estimate a line with 100 observed points included outliers using RANSAC framework.

Q3.2. Write a code to estimate a line with 100 observed points included outliers using RANSAC framework.

Q3.3. Draw an estimated line with 100 observed points included outliers.

Q.3.4. Compare an estimated line using RANSAC framework with total least squares solution with 100 observed points included outliers.