

In the first case we have a 3×3 matrix A which has a dominant eigenvalue as we see from its diagonal form D . The function `powermethod` obtains the value of that eigenvalue in 7 iterations and gives us the eigenvector q which coincides with some small error with the second column (because the dominant eigenvalue is on the second column of D) of the matrix P , since the latter has the eigenvector as columns. This is better seen in the basis where A is diagonal. In that basis we have that the eigenvector is v , which has a 1 in the second component and a little and similar error in the first and third. This indicates that the larger eigenvalue is on the second column of D as we knew and that the other two eigenvalues have similar values, as we can check.

In the second case we have a 3×3 matrix A which has a dominant eigenvalue with similar value to the second biggest eigenvalue as we see from its diagonal form D . The `powermethod` function obtains the value of the larger eigenvalue in 78027 iterations against the 7 iterations needed when the matrix has a largely dominant eigenvalue. The function gives us the eigenvector q as well, it coincides with the third column with some small error, bigger than in the previous case, of the matrix P . This is again better seen in the basis where A is diagonal. In that basis we have that the eigenvector is v , which has a value close to 1 in the third component and a appreciable error in the first. This indicates that the larger eigenvalue is on the third column of D as we knew and that the second larger eigenvalue is in the first column of D , as we can check. In this case the error is bigger because the two larger eigenvalues are very similar. In the previous case this error was much smaller since the eigenvalue dominance was much bigger.

The discussion for the next two cases is the same but with higher dimensions.