

TASK 1

What does the W matrix represent in a non-negative matrix factorization? (1 point)

What does the H matrix represent in a non-negative matrix factorization? (1 point)

TASK 2

Implement non-negative matrix factorization by hand. (3 points)

Using your implementation, factorize

$$\begin{bmatrix} 1 & 2 & 0 \\ 0 & 3 & 0 \\ 2 & -4 & 2 \end{bmatrix}$$

into two three-dimensional subspaces. Report a $W \cdot H$ for a good random initialization. (1 point)

TASK 3

Using your implementation, factorize the term-document matrix into two two-dimensional subspaces. (1 point)

Using the decomposition, calculate the term-term similarity matrix. (1 point)

Using the decomposition, calculate the document-document similarity matrix. (1 point)

How do these matrices compare with those produced by SVD with two singular values? (1 point)