Tema MN #2 - **SVD**, **PCA** & **Eigenfaces**

In aceasta tema am implementat algoritmi de DVS (SVD in engleza), ACP (PCA in engleza) si unul bazat pe matricea covarianta, pentru a comprima o imagine. A doua parte a temei a fost reprezentata de implementarea unui algoritm de recunoastere faciala, "Eigenface".

Partea I

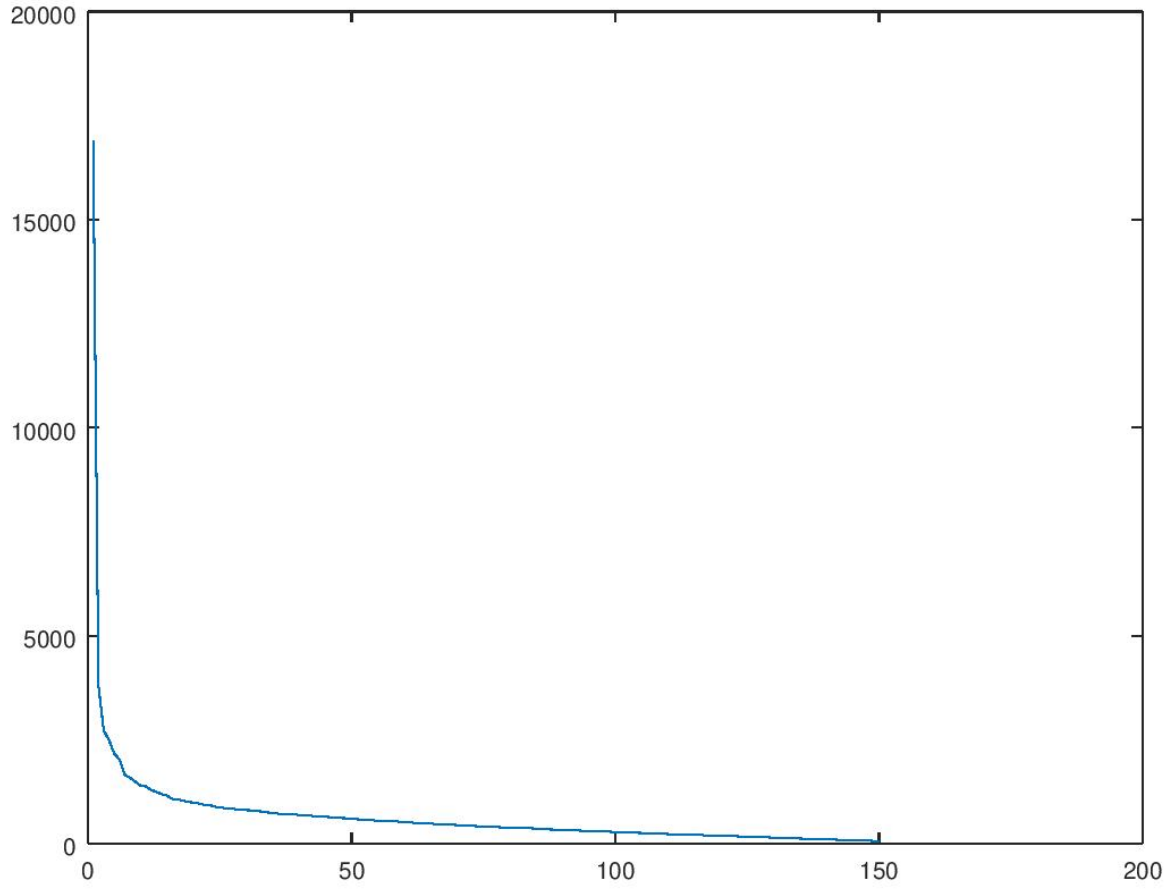
Toti algoritmi sunt descrisi in cerinta, iar implementarea lor a fost relativ simpla, deoarece este descris algoritmul pas cu pas.

Pentru SVD si PCA, am realizat grafice ce reprezinta:

- valorile singulare ale imaginii/ vectorul diag(S)
- informatia data de primele k valori singulare
- eroarea aproximarii
- rata de compresie a datelor

SVD

Imaginea 2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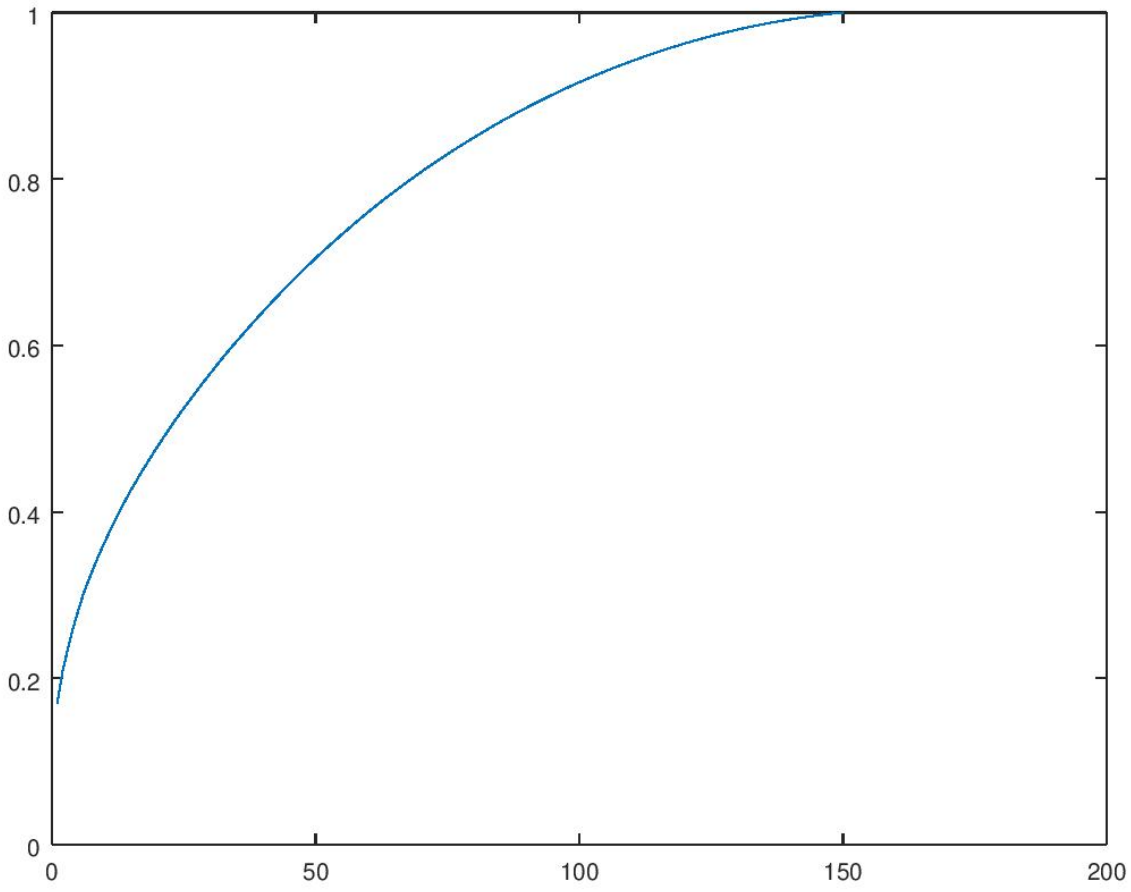
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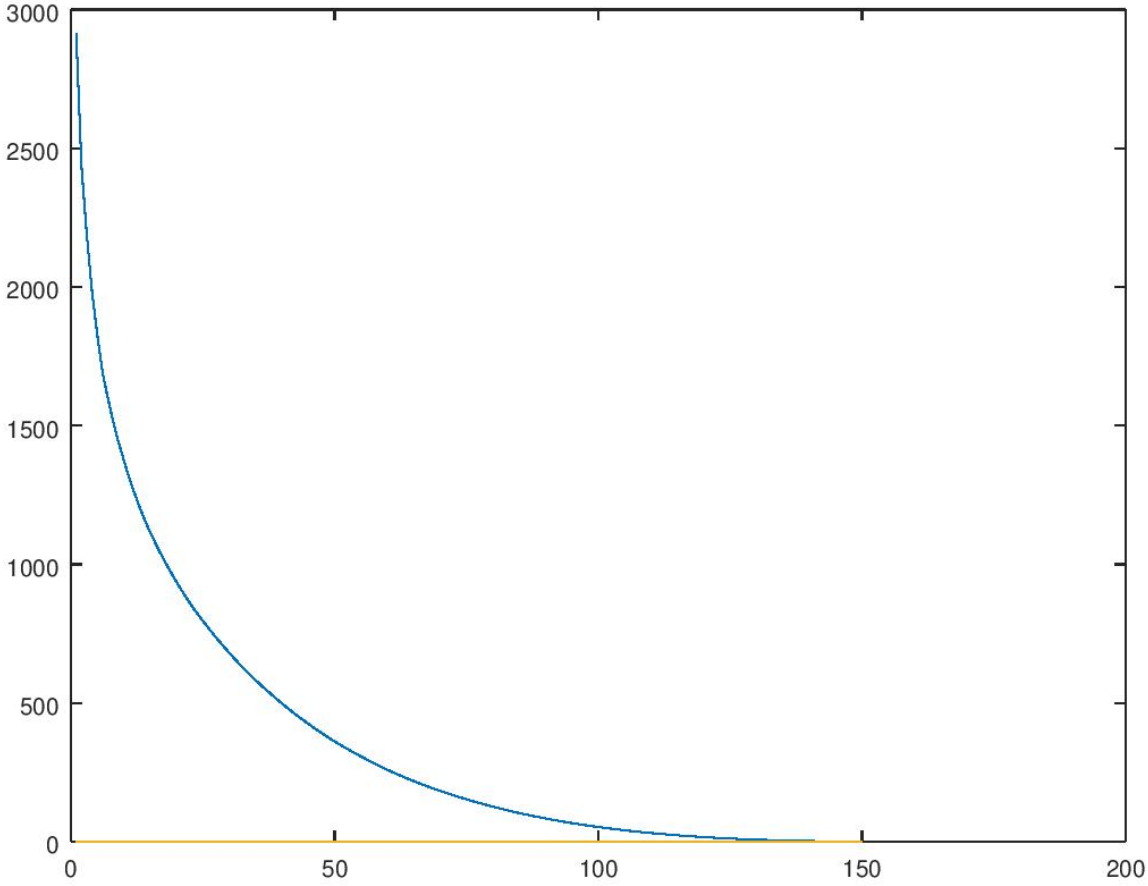
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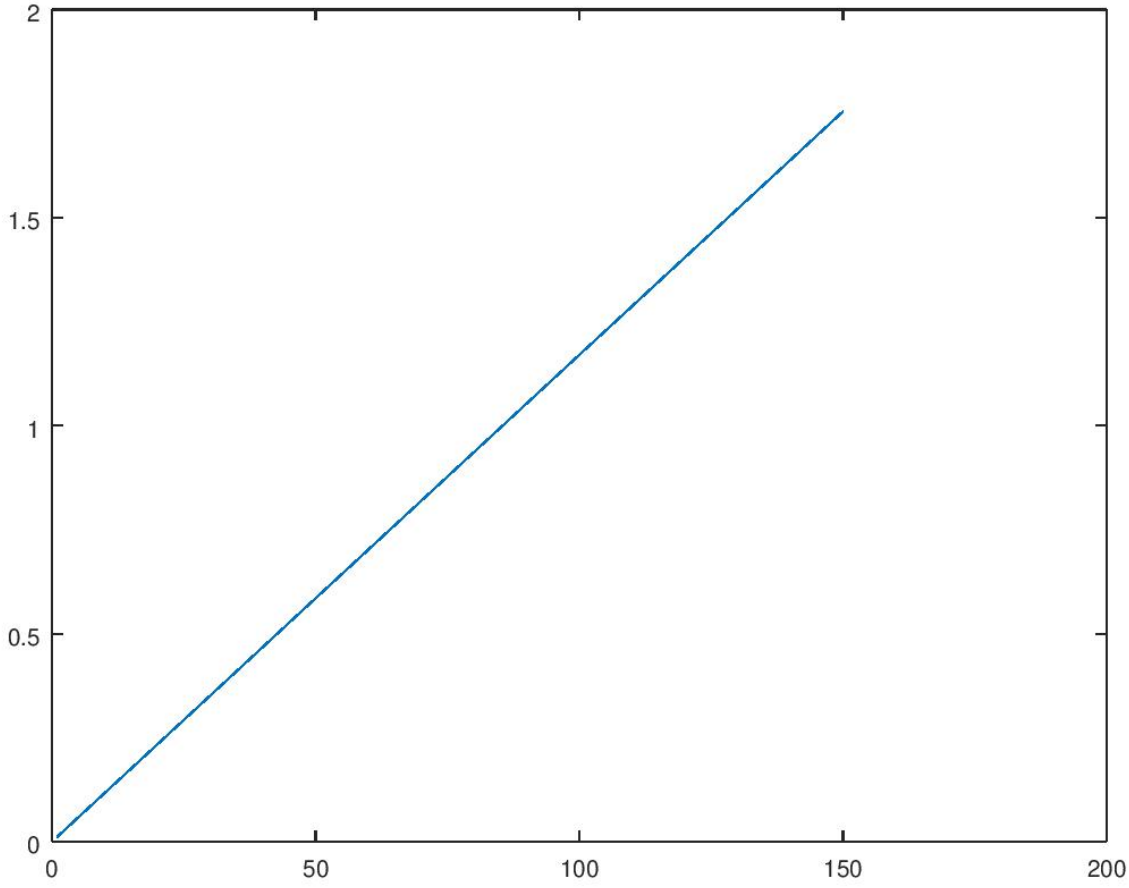
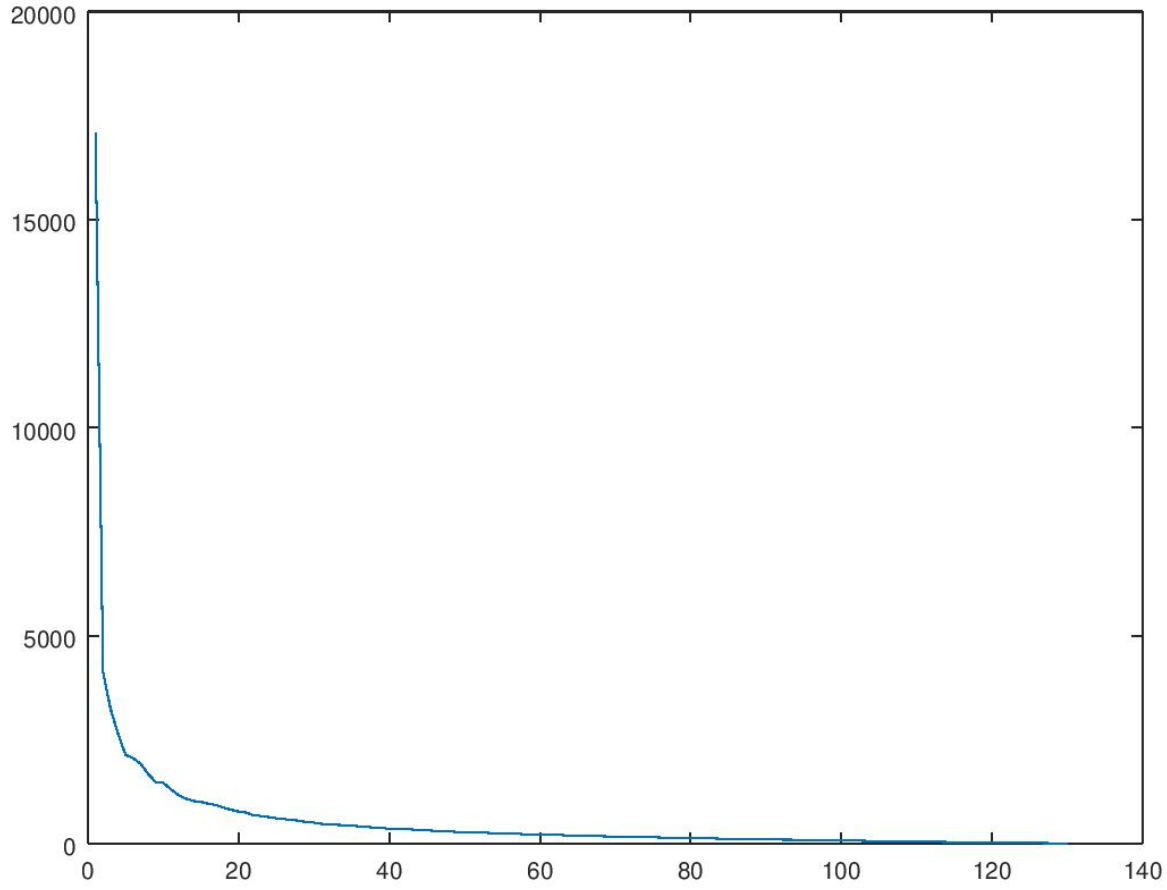


Imaginea 3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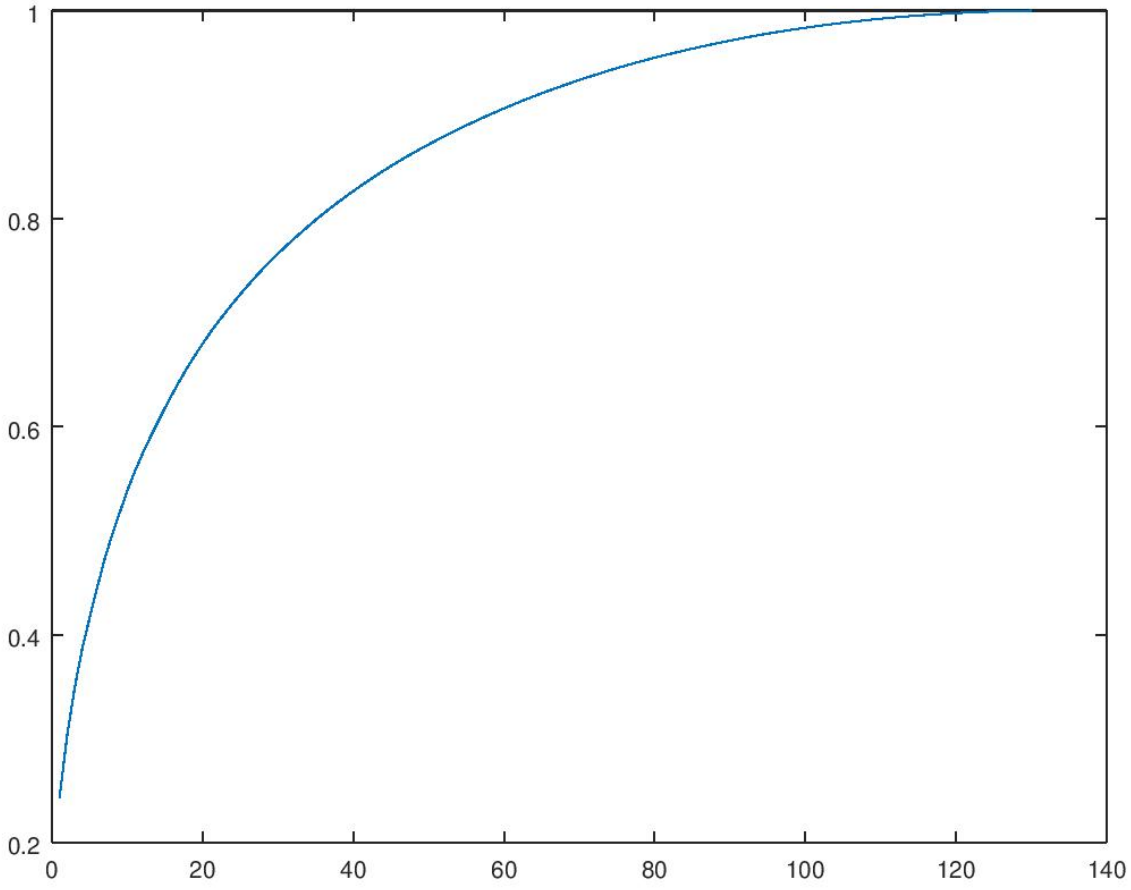
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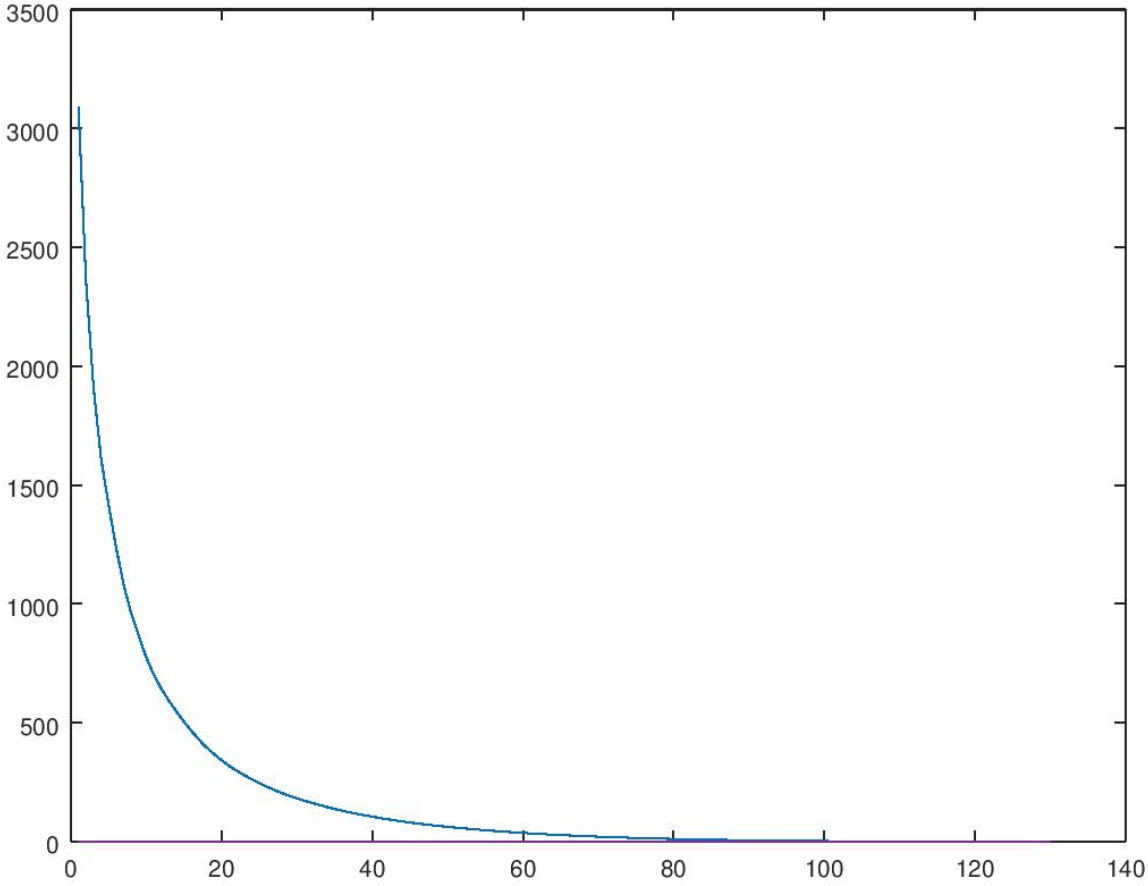
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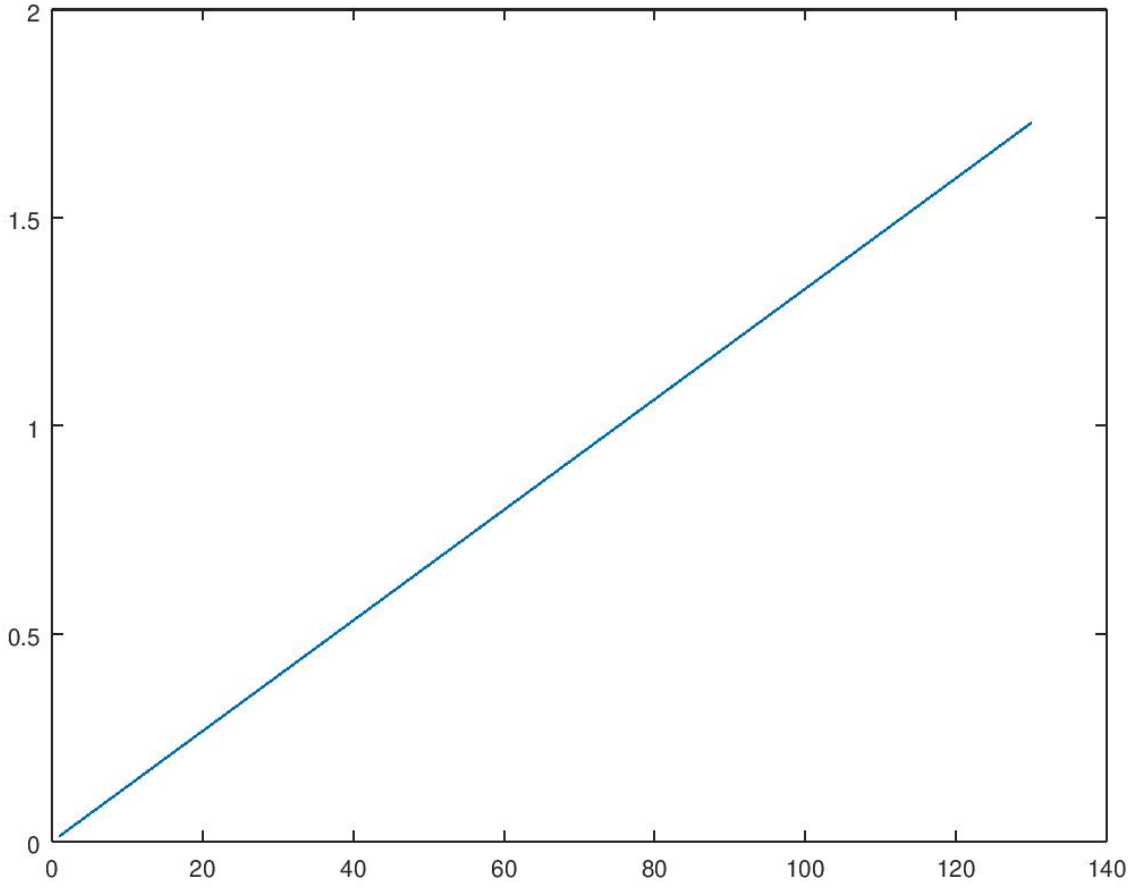
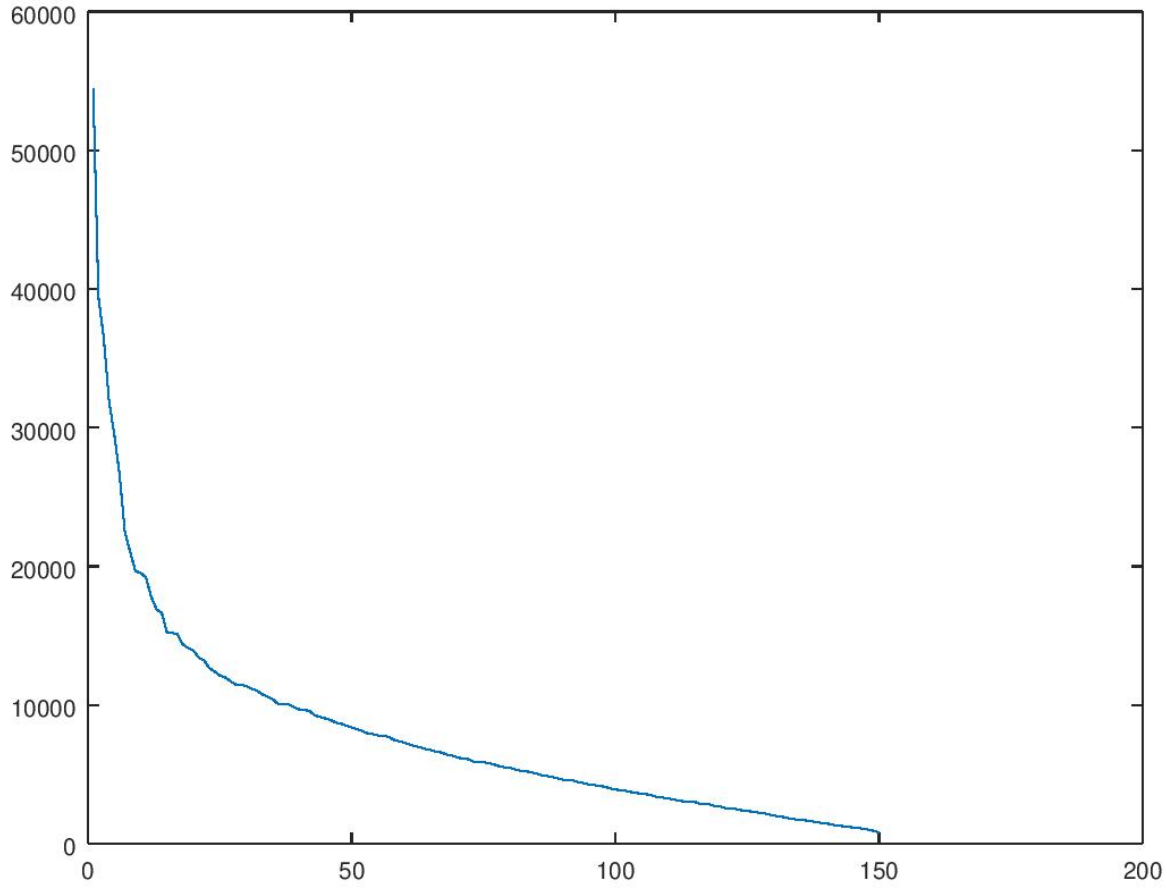


PCA

Imaginea 2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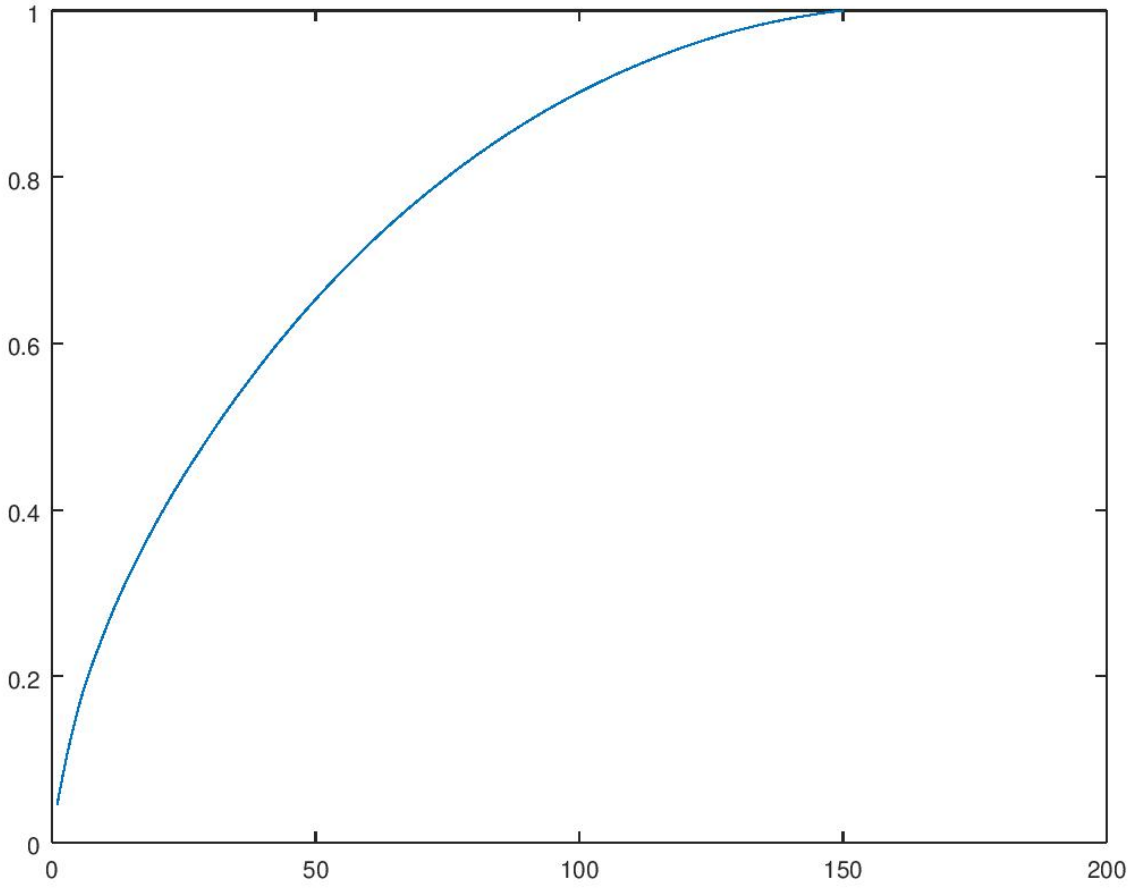
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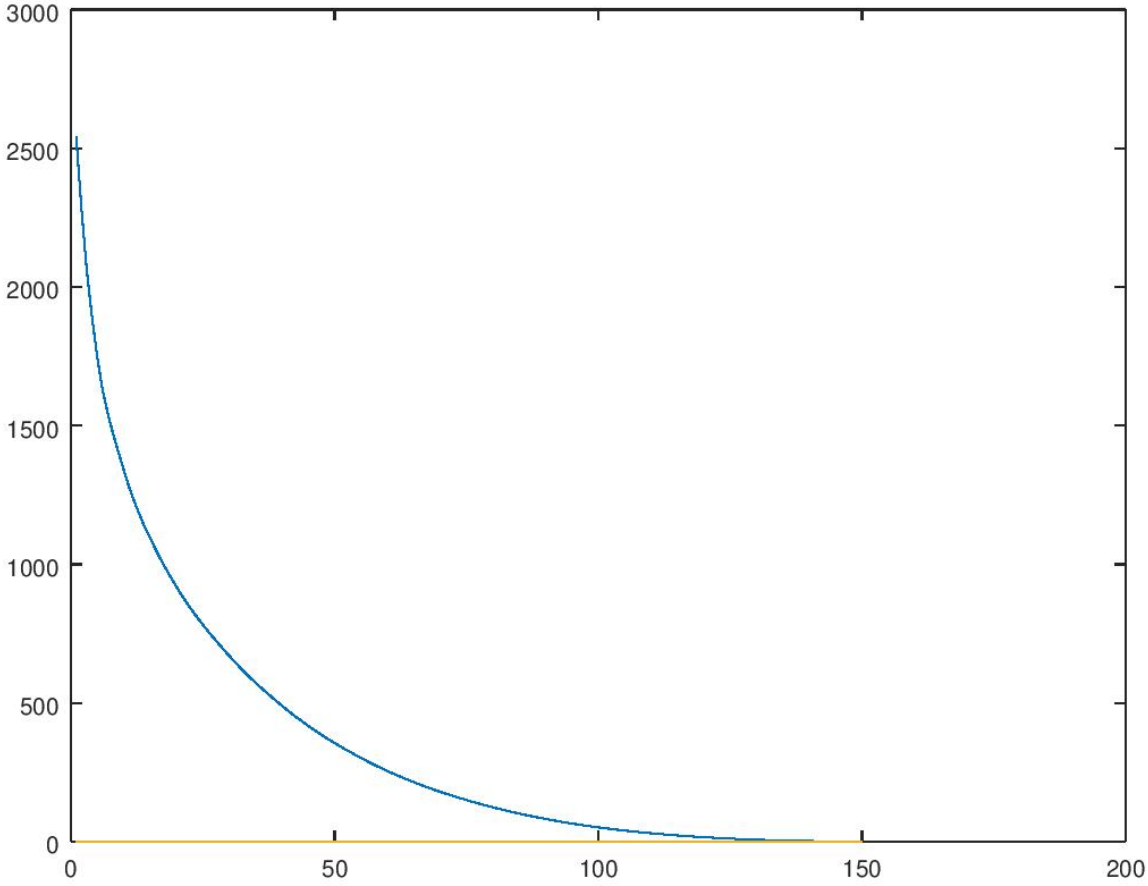
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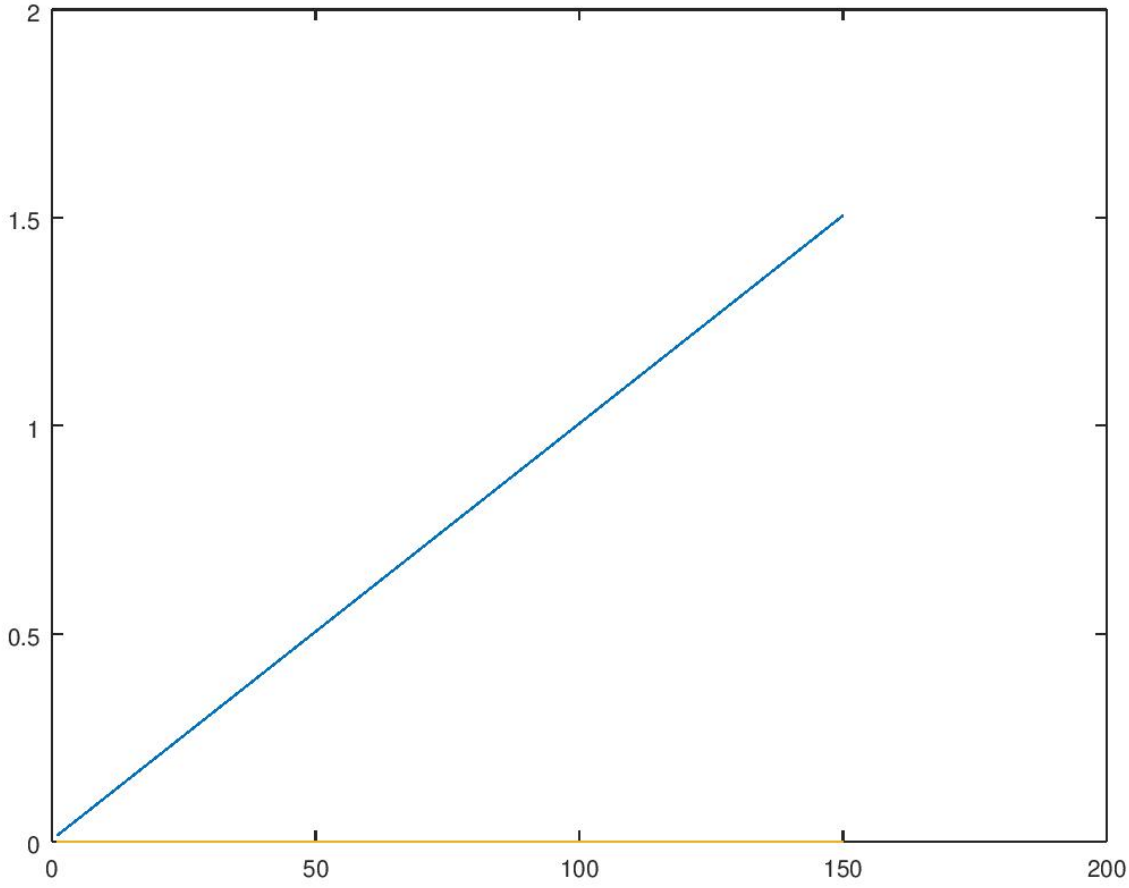
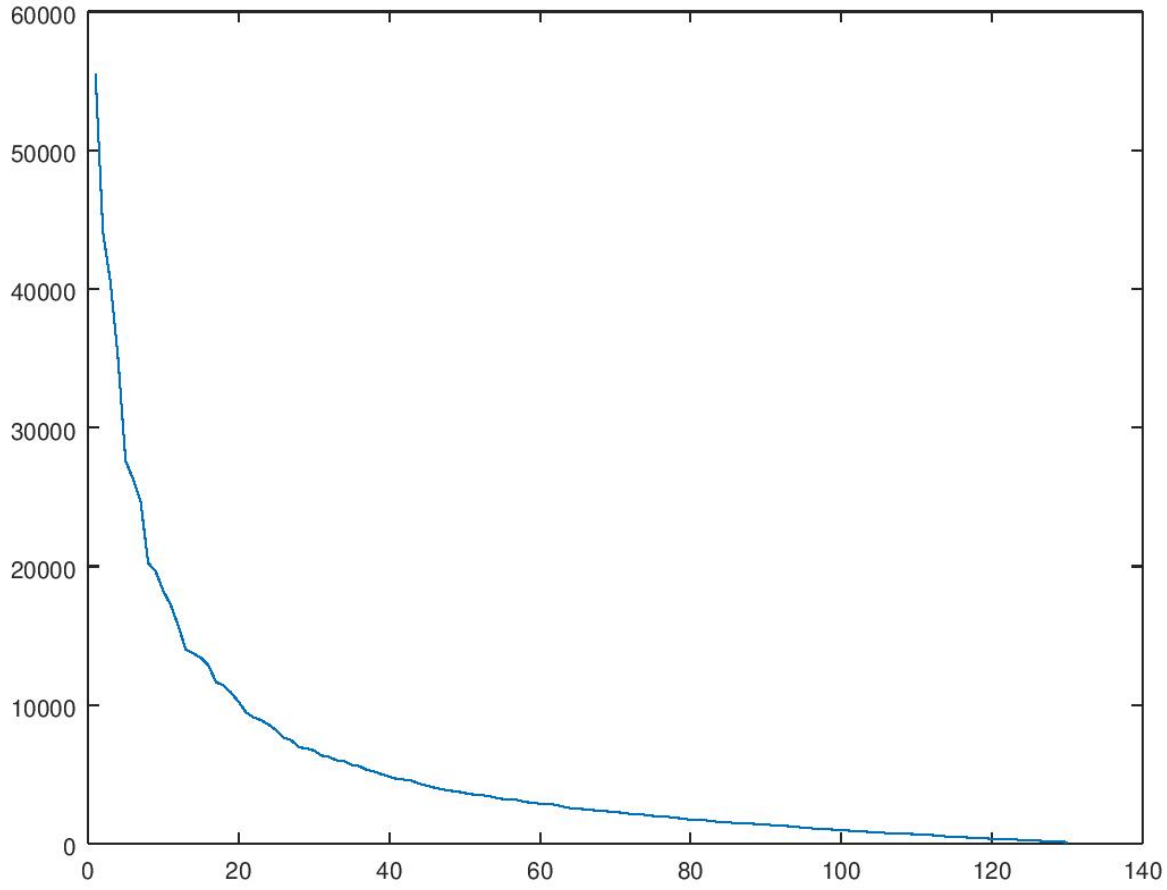


Imaginea 3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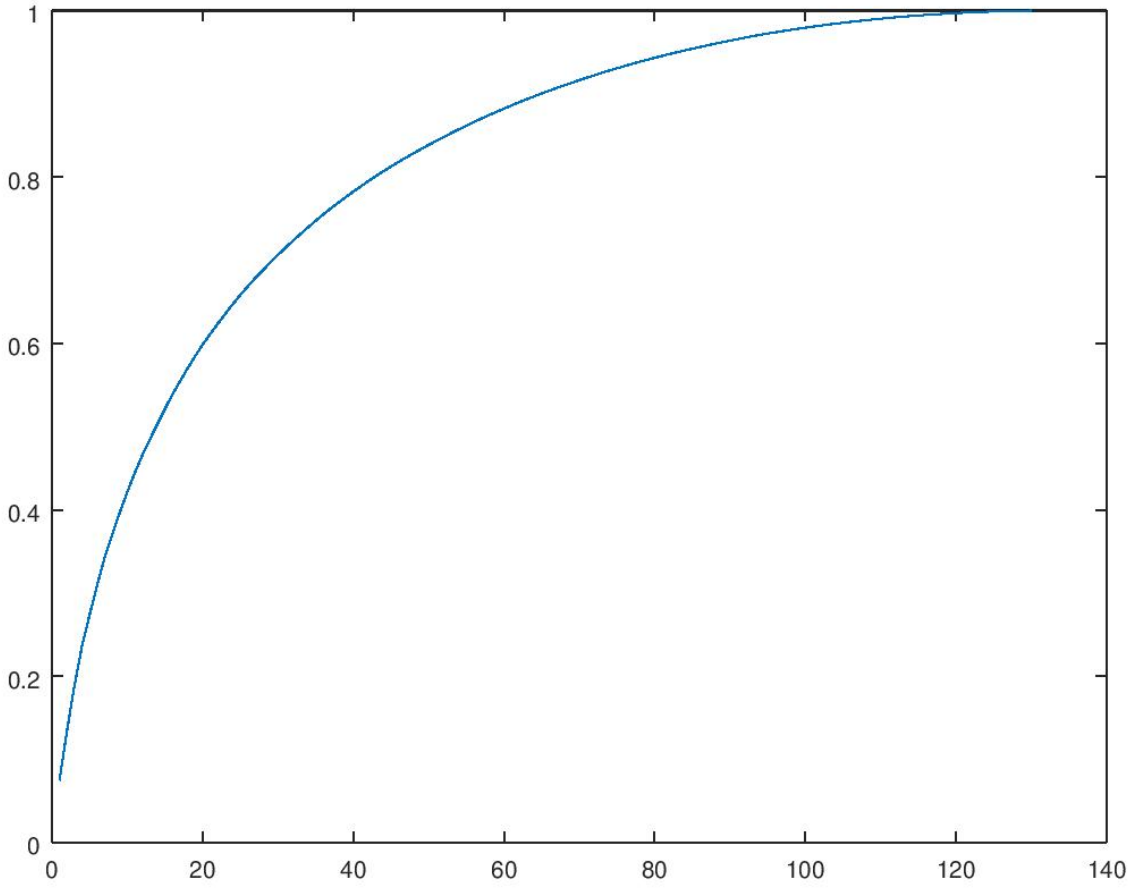
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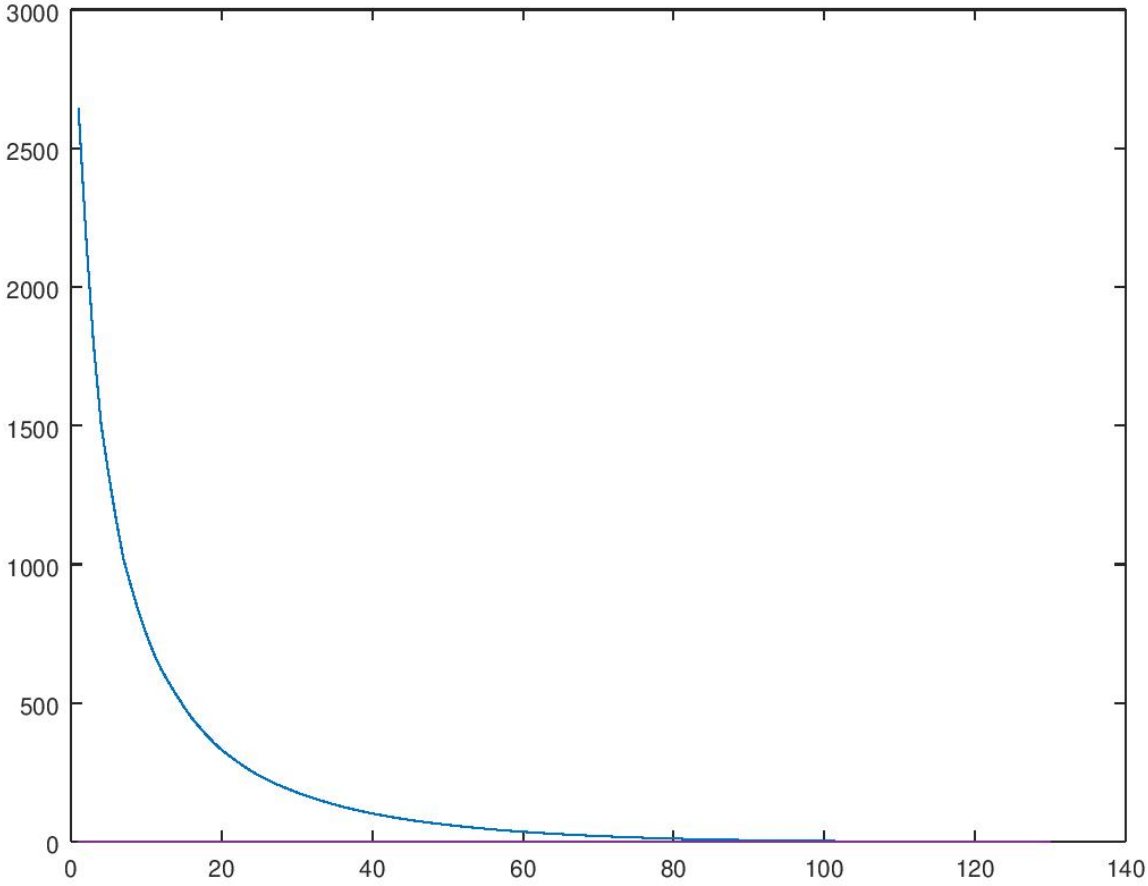
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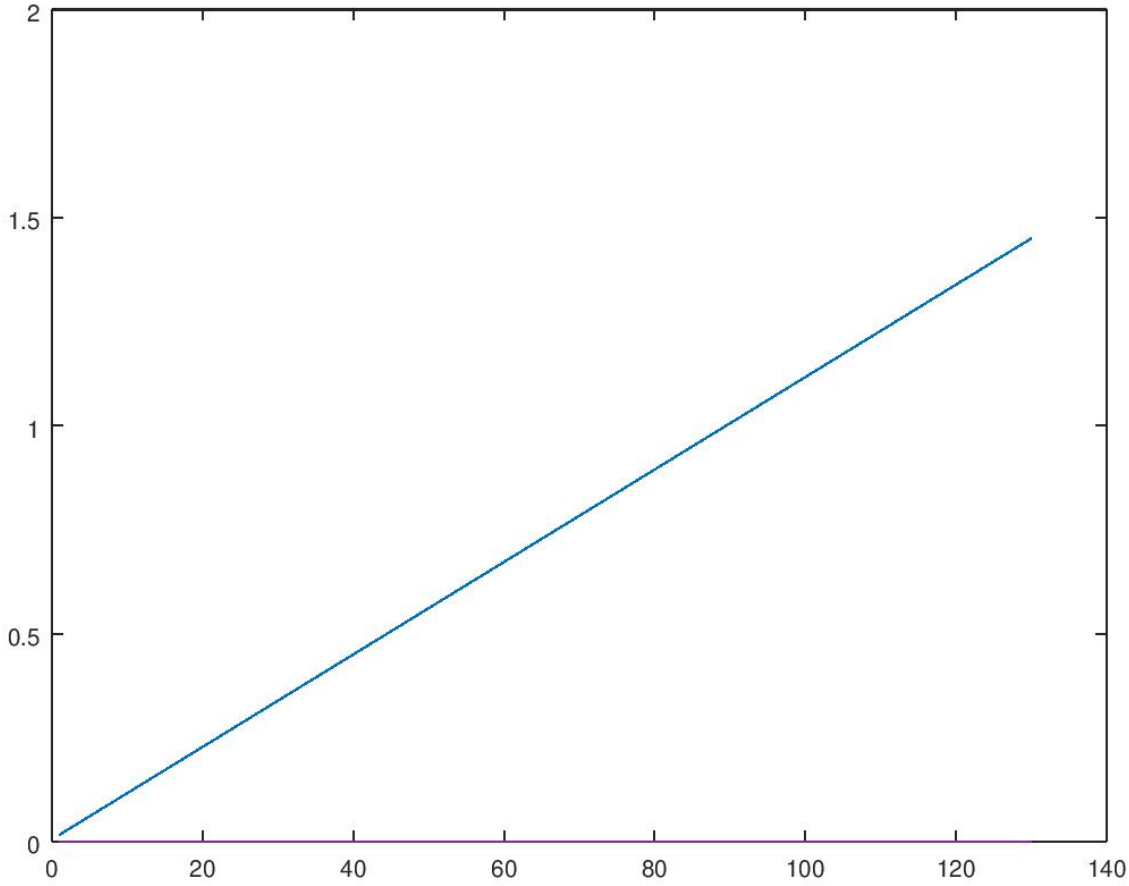

In cazul PCA, rata de compresie a datelor este mai mare

Partea a II-a - Eigenfaces

Aceasta metoda de recunoastere faciala este bazata pe determinarea valorilor si vectorilor proprii.

Implementarea algoritmului este impartita in doua fisiere: eigenface_core.m si face_recognition.m. Prima parte se ocupa de "antrenament", avand la baza un dataset, iar a doua calculeaza "distanta"(diferenta) pana la cea mai asemanatoare imagine si indexul acesteia.

Acest task mi-a ridicat cele mai multe probleme. Am incercat foarte multe implementari, bazate pe algoritmul din pdf, bazate pe prezentarea powerpoint a algoritmului sau de pe internet, dar nu am reusit sa obtin rezulatul corect. Implementarea curenta a taskului 6 este cea bazata pe algoritmul descris in enunt.