Tema 2 - Metode Numerice
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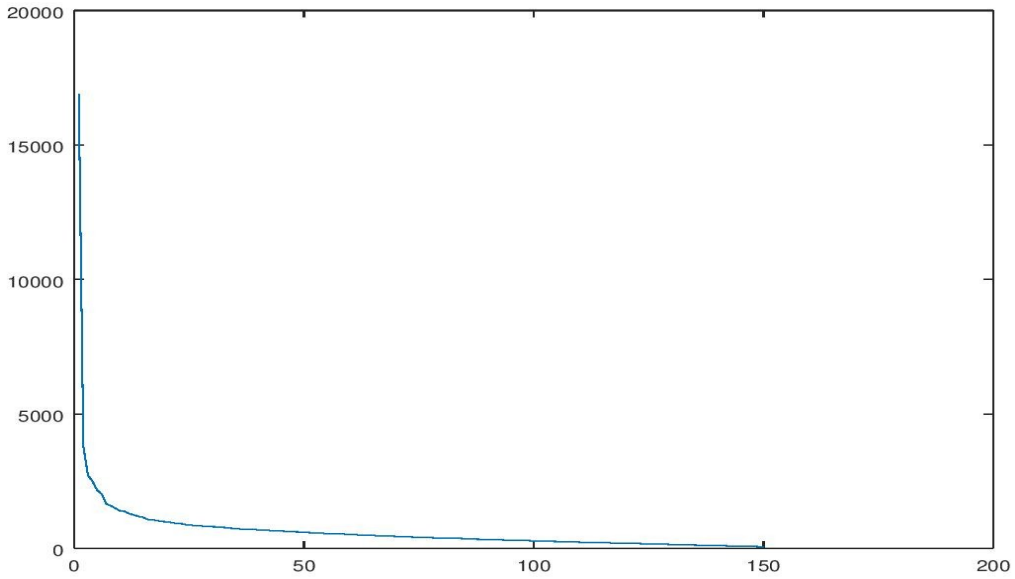
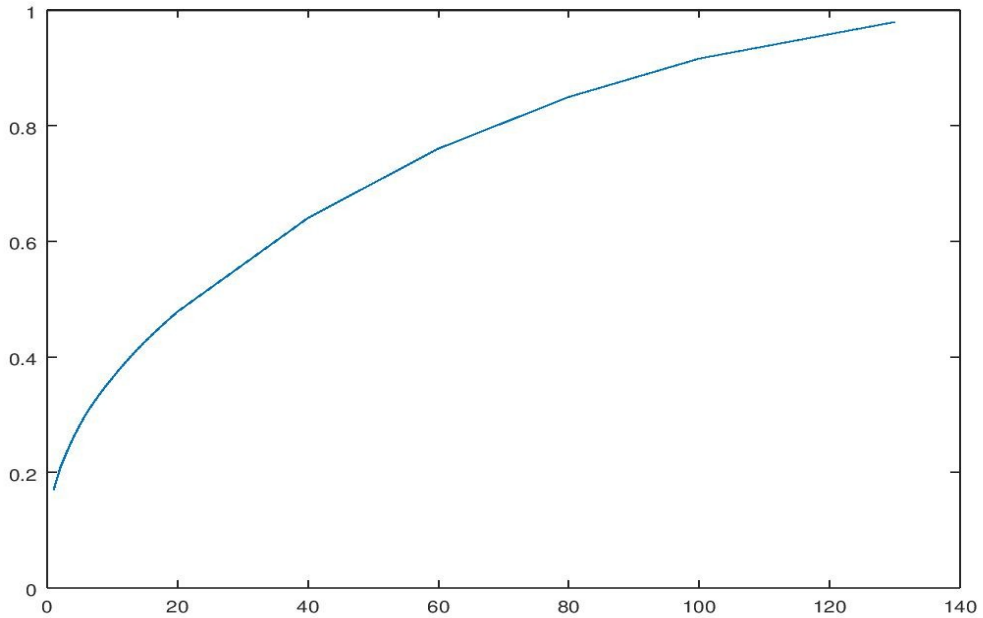
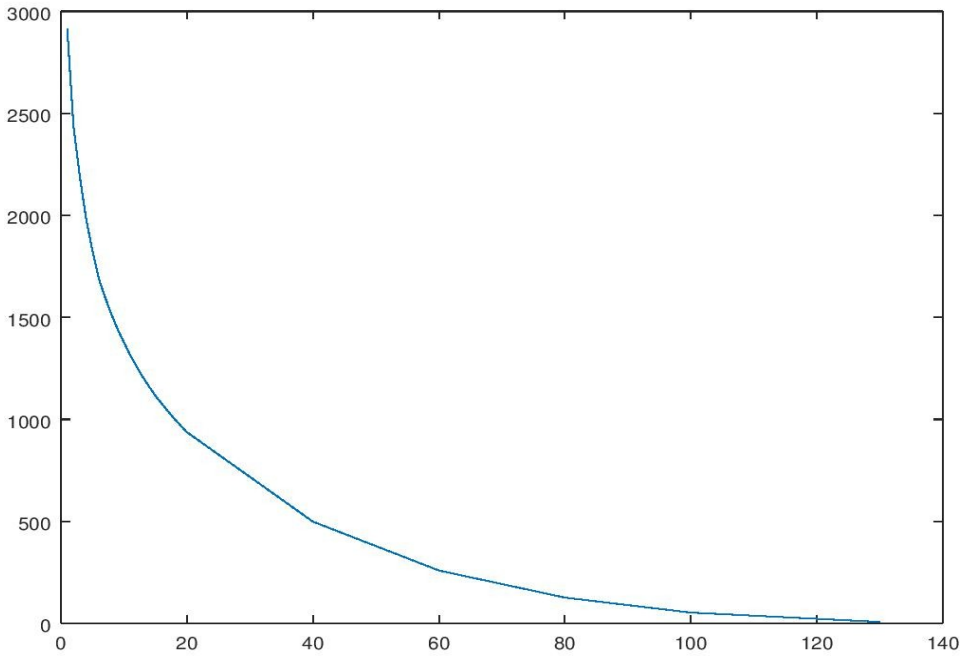
Implementare:

Cerinta 1:
- am citit imaginea intr-o matrice A, careia i-am aplicat descompunerea valorilor singulare cu ajutorul functiei de biblioteca svd(); mai apoi am extras primele k coloane din matricea U, blocul k*k din matricea S si primele k linii din matricea V transpusa, conform algoritmului descompunerii reduse.

Cerinta 2:
- graficele pentru imaginea 2:



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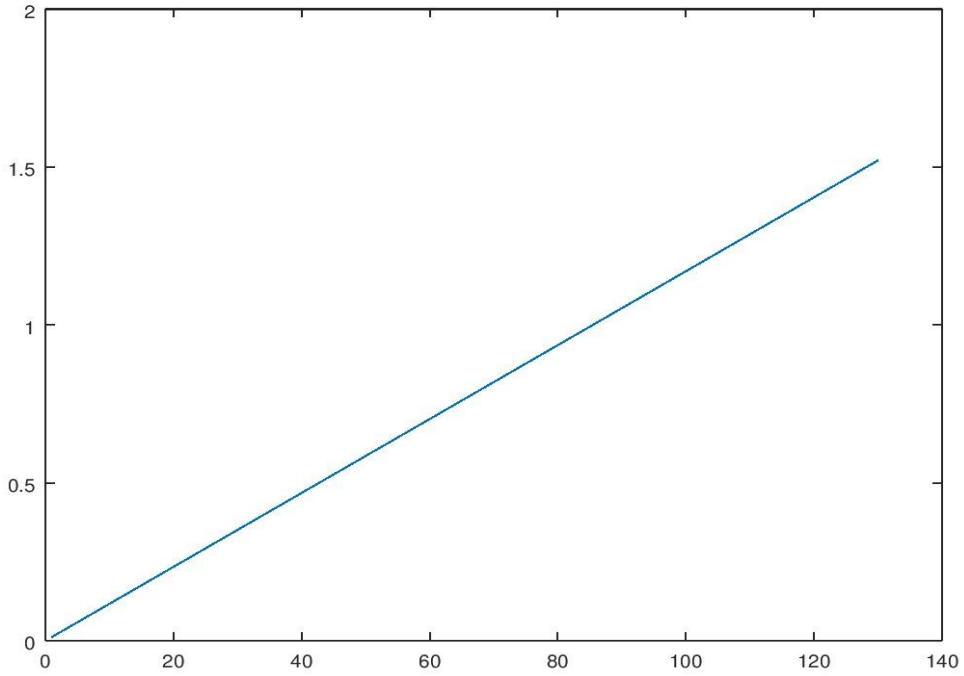
120
140


2
1.5
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0.5
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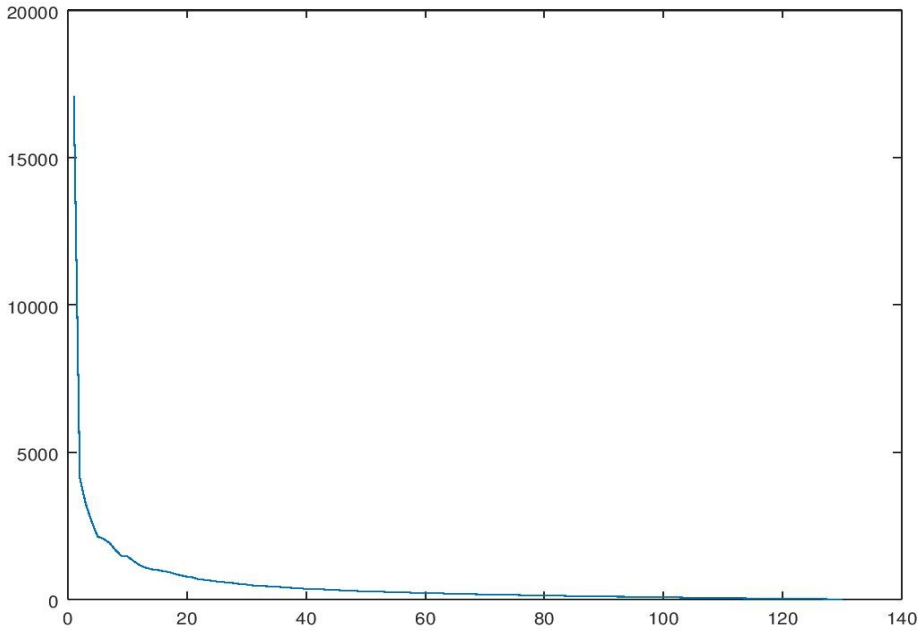
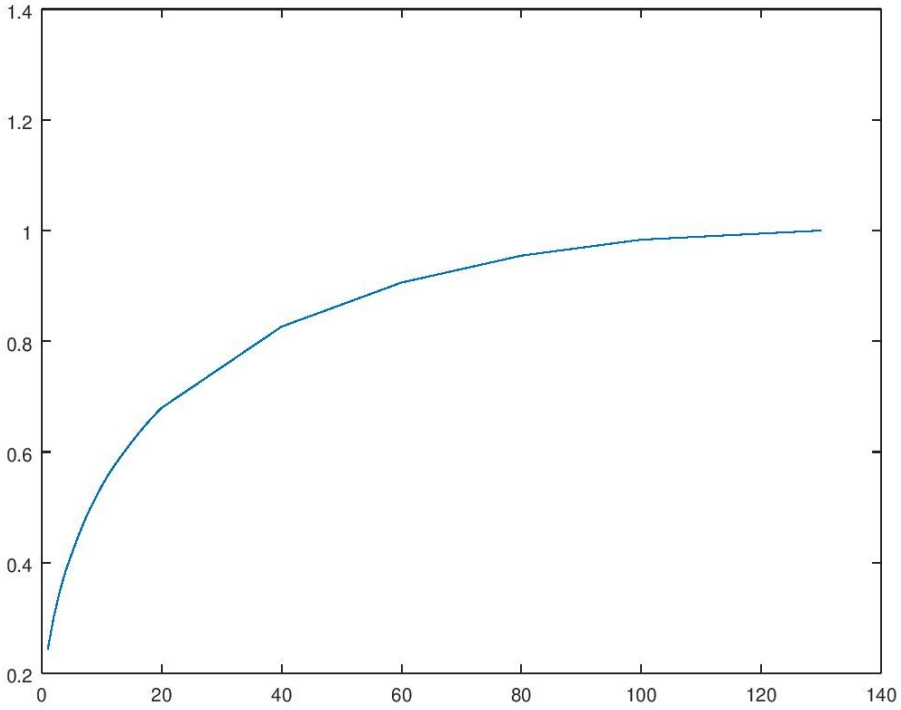
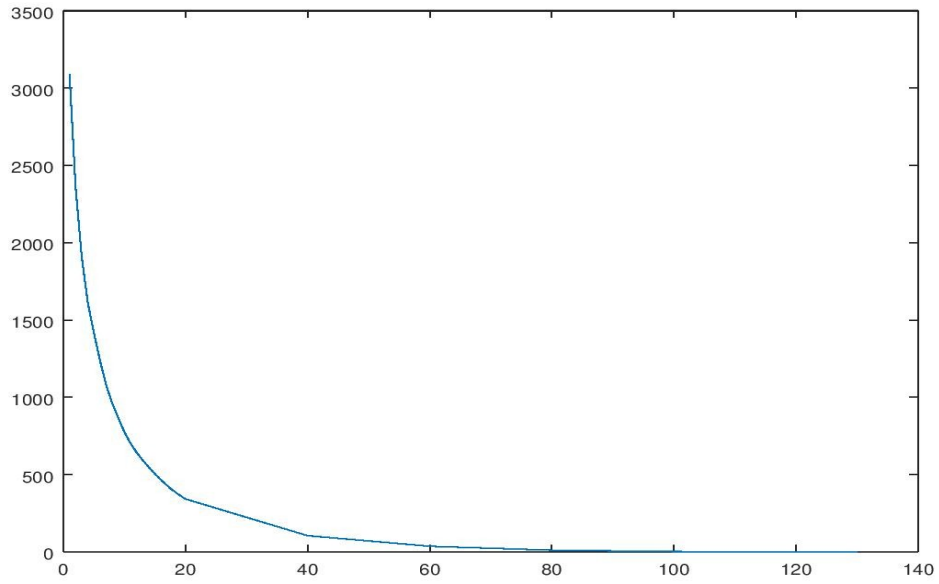
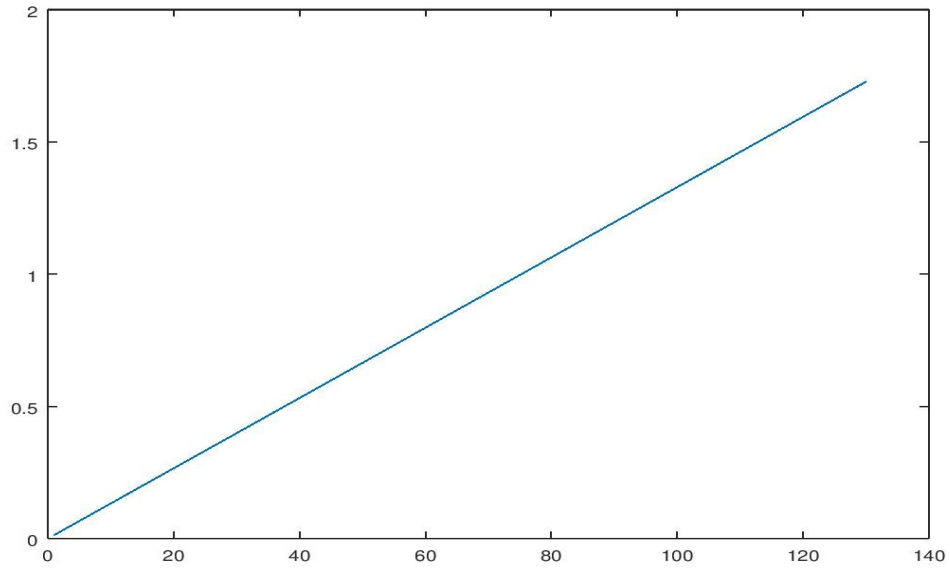
- graficele pentru imaginea 3:







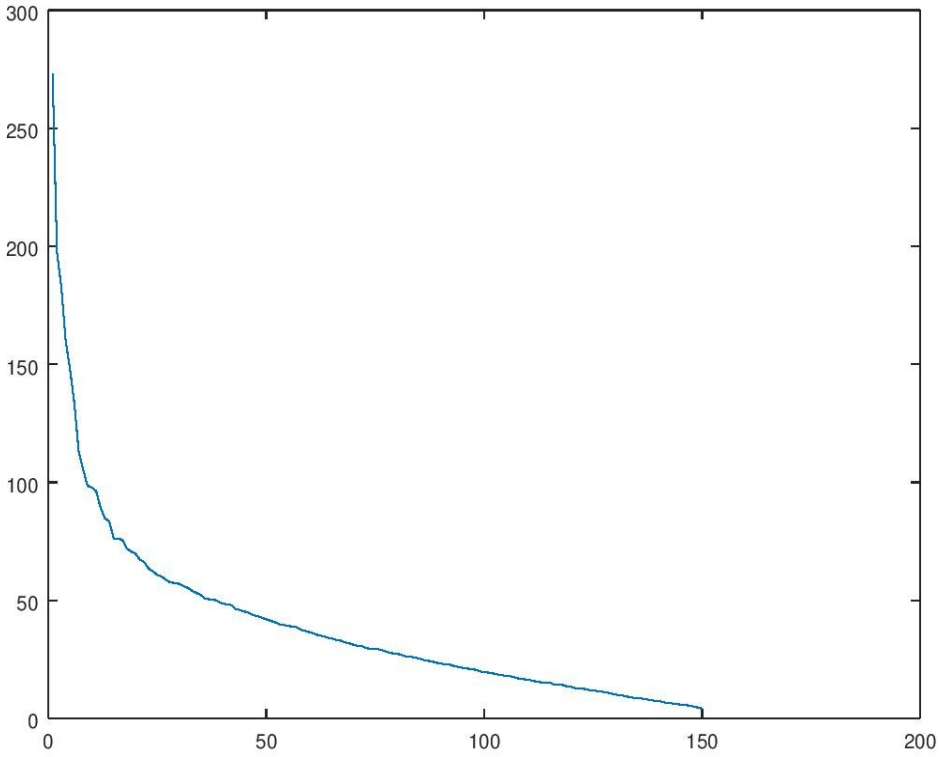


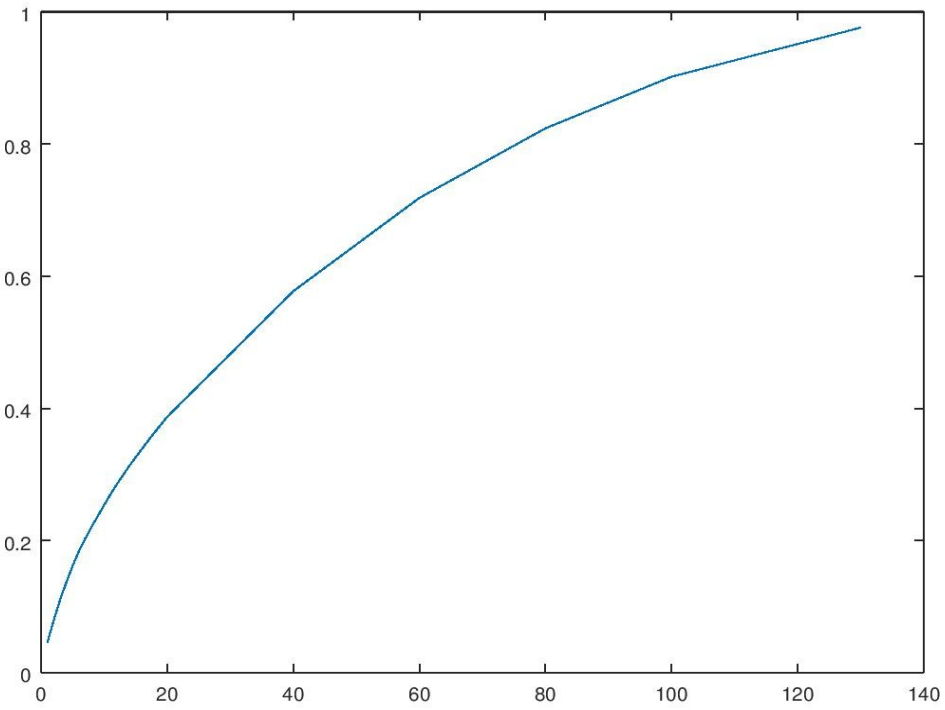
- citesc imaginea intr-o matrice si aleg un vector k, reprezentand numarul de valori singulare alese; aplic apoi functia de la cerinta 1 pentru fiecare dintre aceste k-uri, calculand cu ajutorul formulelor din enunt informatia data de primele k valori singulare, eroarea aproximativa si rata de compresie a datelor.

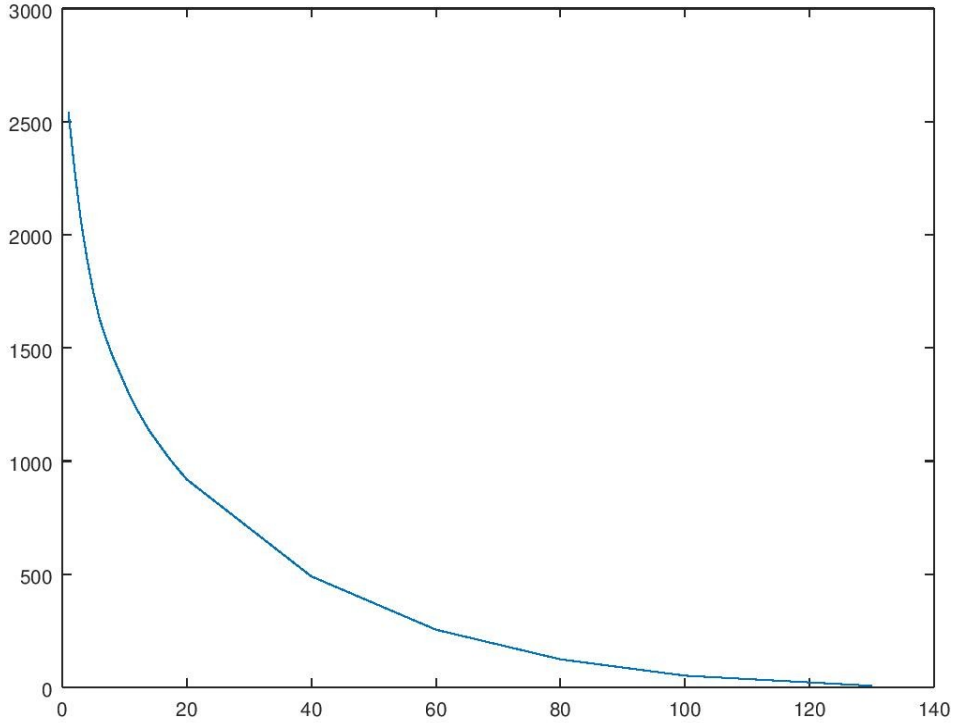
Cerintele 3 si 4:

- am aplicat pas cu pas algoritmii prezentati in enunt, pentru obtinerea componentelor principale prin metoda descompunerii in valori singulare si prin metoda matricei de covarianta.

Cerinta 5:
 - graficele pentru imaginea 2:



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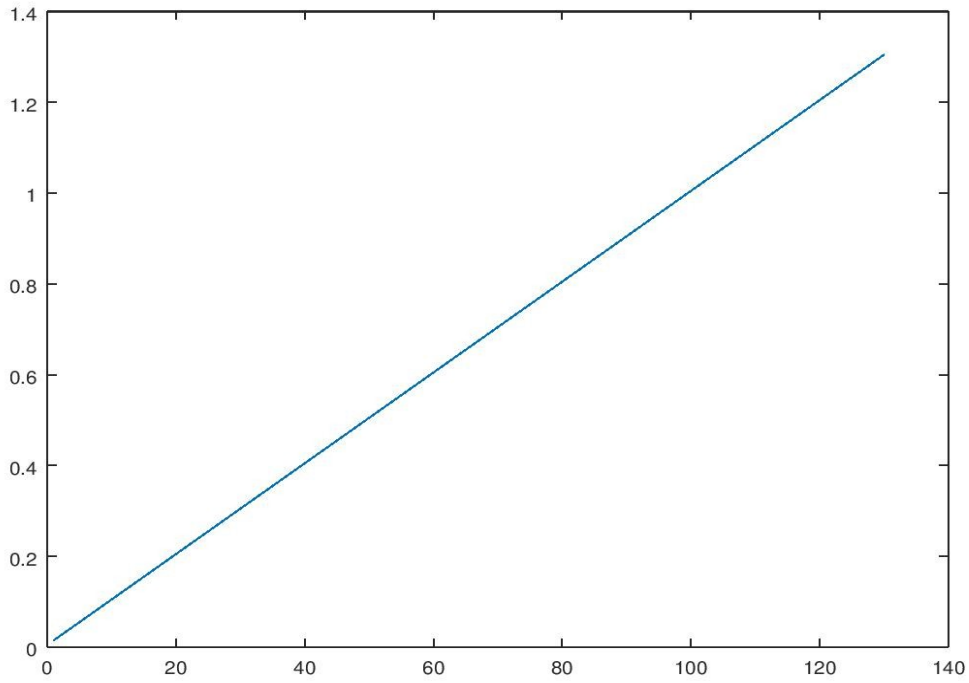
1.4
1.2
1
0.8
0.6
0.4
0.2
0
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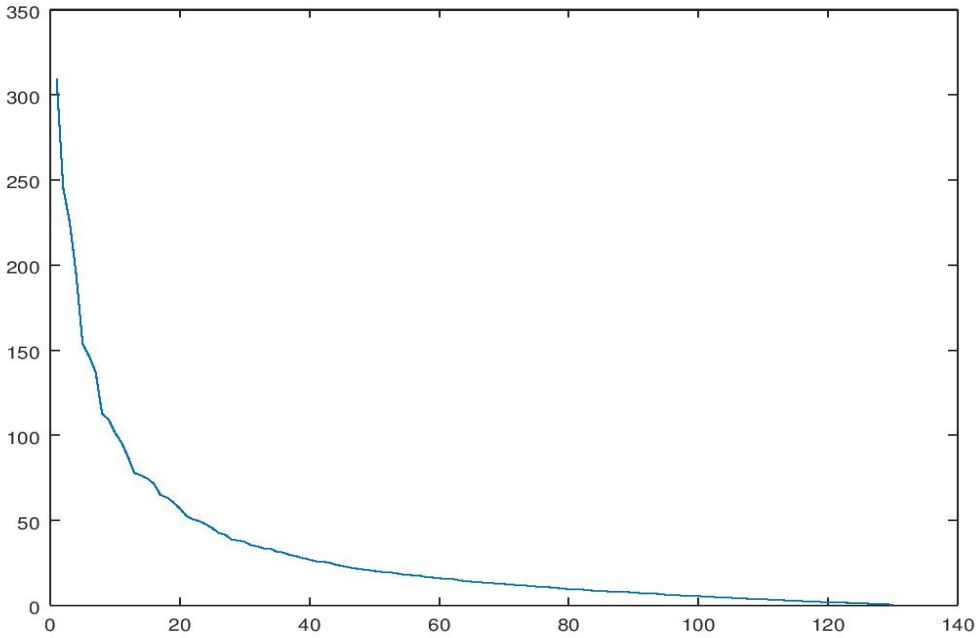
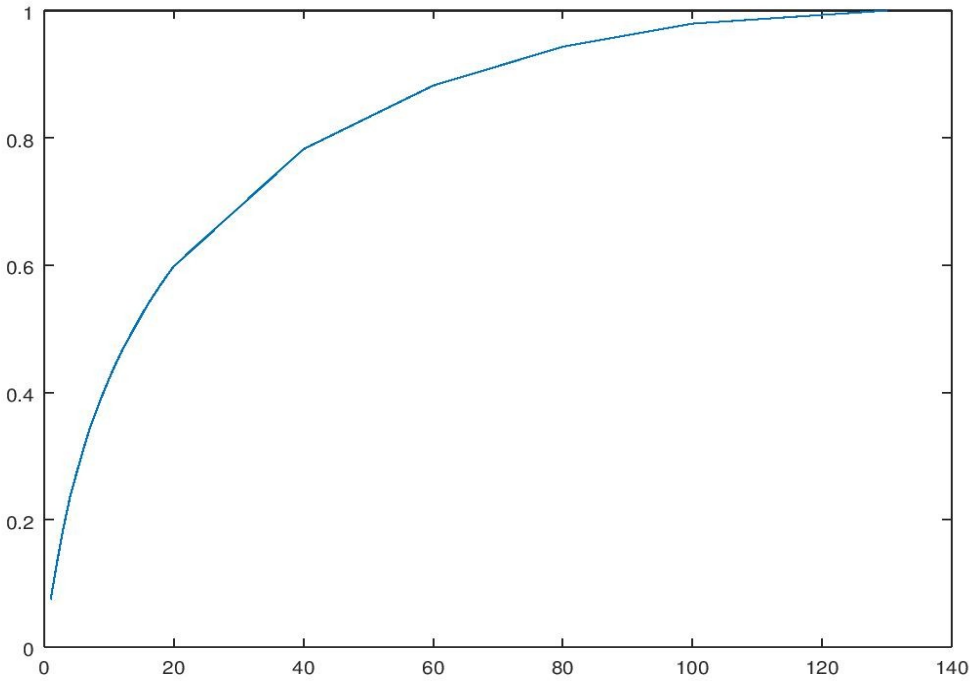
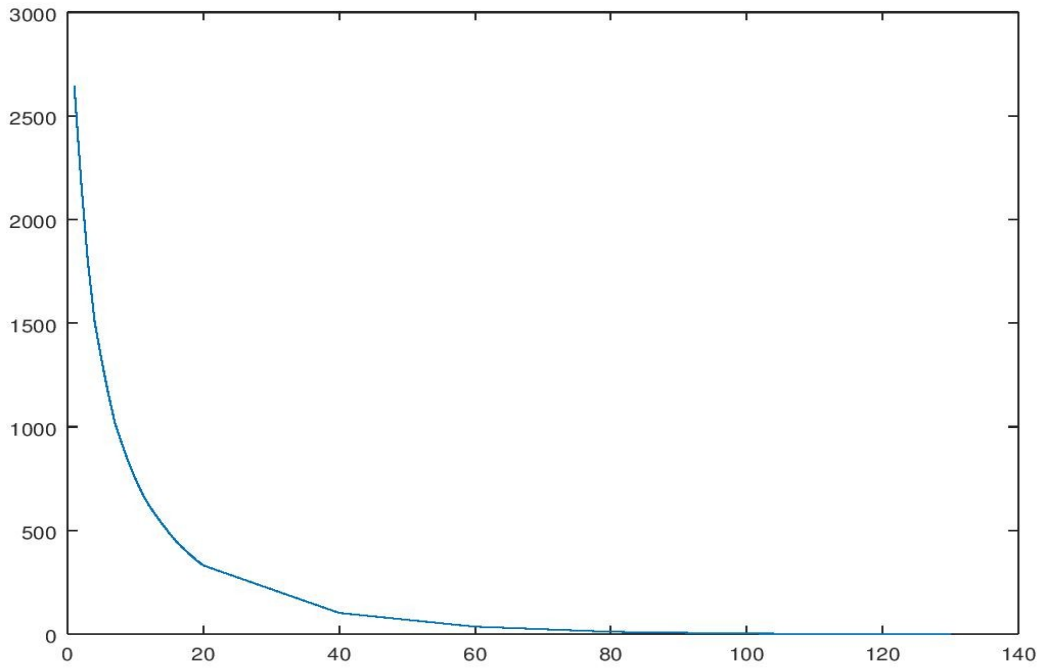
- graficele pentru imaginea 3:



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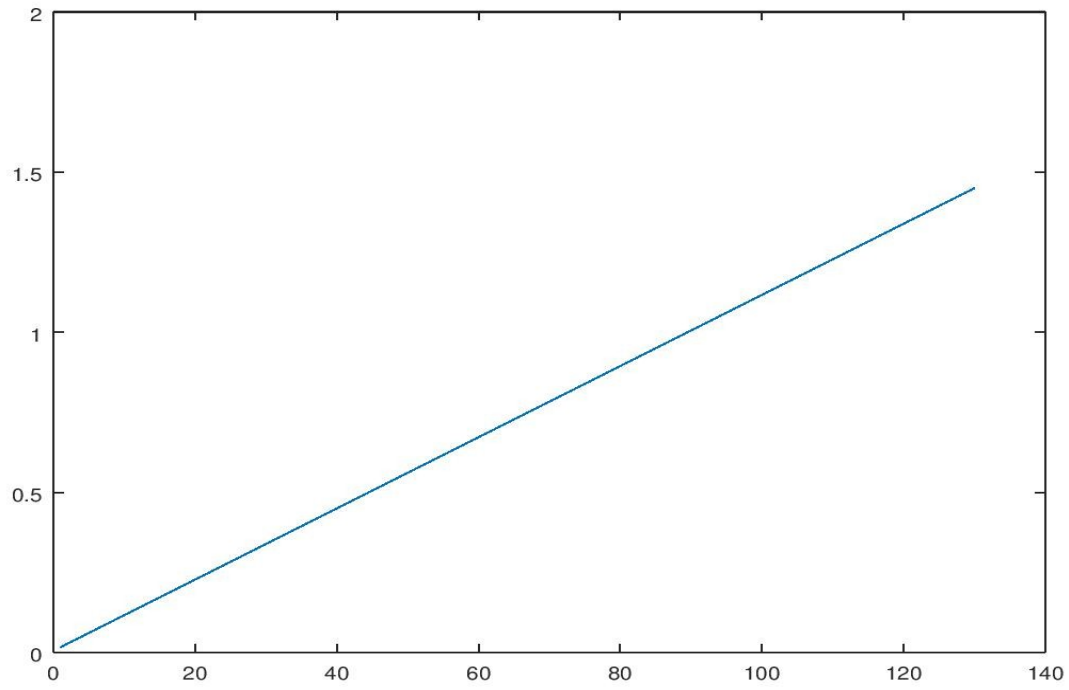
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Cerinta 6:

- am citit fiecare imagine din multimea de date intr-o matrice t, pe care am transformat-o intr-un vector coloana, pe care l-am adaugat la matricea T; am calculat media fiecarei linii si am scazut-o din matricea initiala, obtinand o noua matrice, A; am ales vectorii proprii ai matricei A’ * A, corespunzatori valorilor proprii supraunitare, si am construit spatiul “fetelor” si proiectia fiecarei “fete” in acest spatiu; apoi, pentru o imagine de proba, am determinat proiectia ei in spatiul “fetelor” si am gasit cea mai apropiata imagine de aceasta.