

Raport

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Problema 1

Considerăm următoarele distribuții: $\text{Bin}(n, p)$, $\text{Pois}(\lambda)$, $\text{Exp}(\lambda)$, $\mathcal{N}(\mu, \sigma^2)$.

1. Generăm $N = 1000$ de realizări independente din fiecare repartiție și calculăm media și varianța eșantionului.

```
N = 1000

binomials = rbinom(N, size = 50, prob = .65)
poissons = rpois(N, lambda = 3)
exponentials = rexp(N, rate = 3)
normals = rnorm(N, mean = 5, sd = 1.3)

binomial_mean = mean(binomials)
binomial_variance = var(binomials)

pois_mean = mean(poissons)
pois_variance = var(poissons)

exponential_mean = mean(exponentials)
exponential_variance = var(exponentials)

normal_mean = mean(normals)
normal_variance = var(normals)
```

2. Ilustrații grafice pentru funcțiile de masă, respectiv de densitate, pentru repartițiile date.

Considerăm 5 seturi de parametri pentru fiecare repartiție

Binomiala:

```
##      [,1] [,2] [,3] [,4] [,5]
## n    "40" "40" "30" "20" "50"
## p    "0.7" "0.2" "0.6" "0.7" "0.8"
## color "red" "green" "yellow" "purple" "black"
```

Poisson:

```
##      [,1] [,2] [,3] [,4] [,5]
## lambda "1.3" "2.1" "4"  "8.7" "4"
## color  "red" "green" "yellow" "purple" "black"
```

Exponentiala:

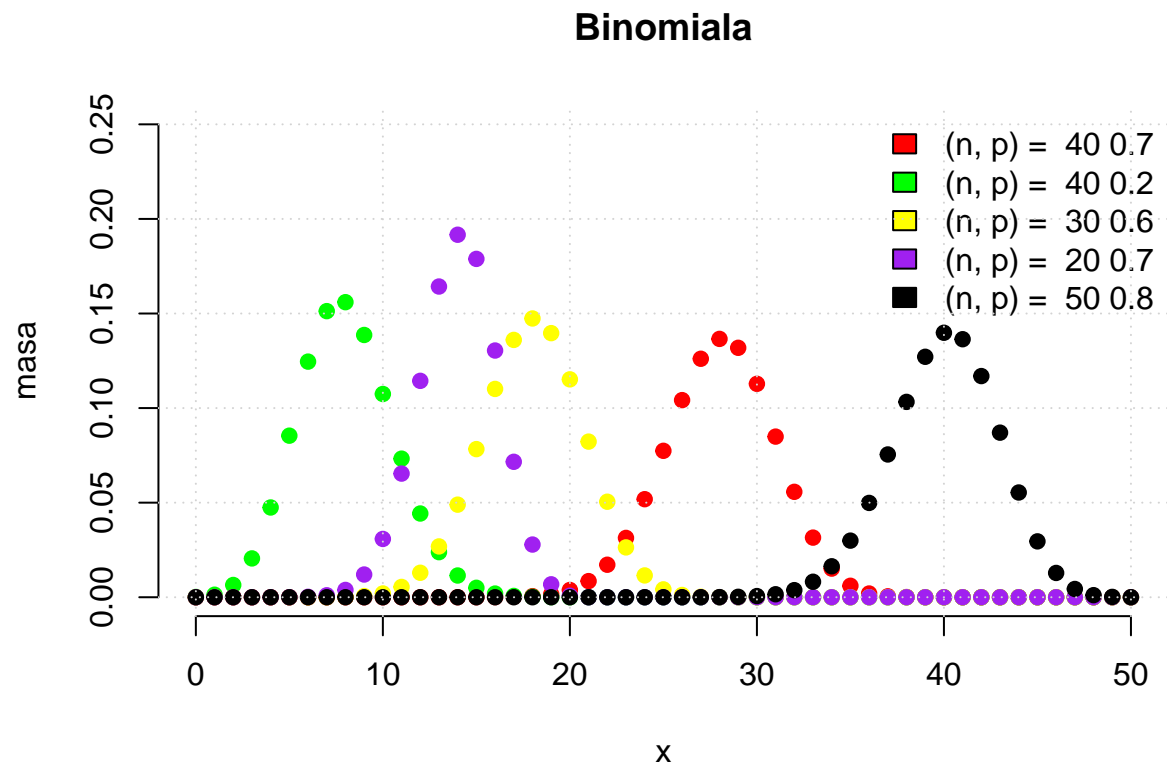
```
##      [,1] [,2] [,3] [,4] [,5]
## lambda "0.4" "0.7" "1.3" "2.1" "4"
## color  "red" "green" "yellow" "purple" "black"
```

Normala:

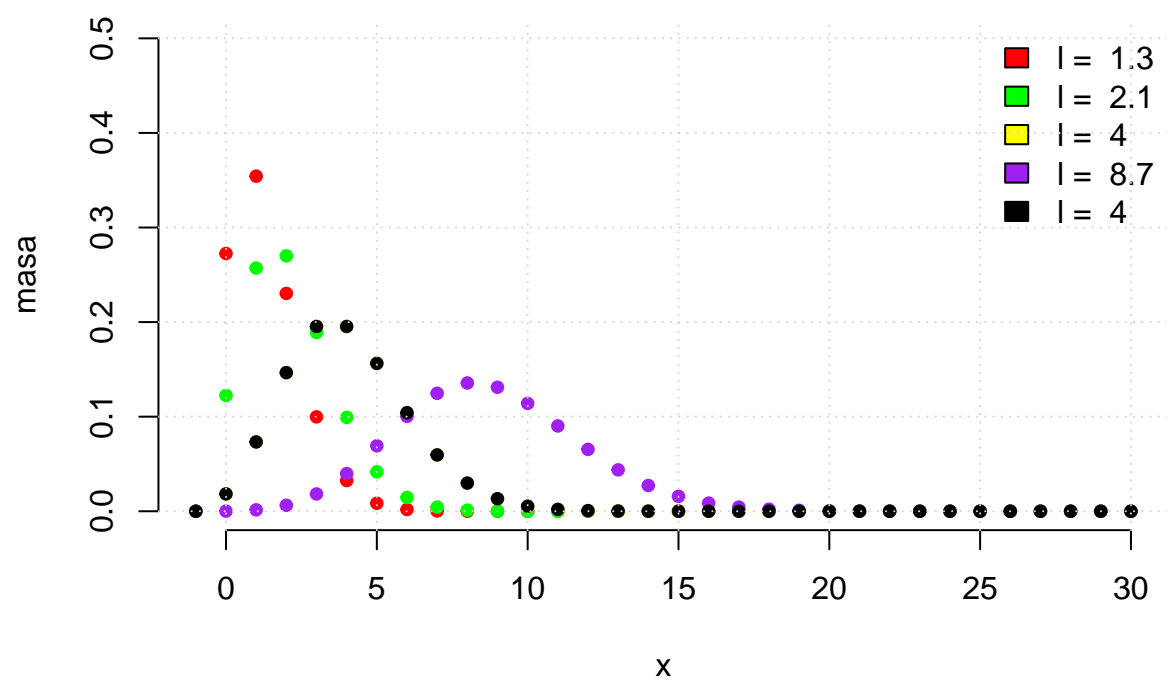
```
##      [,1] [,2] [,3] [,4] [,5]
## mean   "-1" "0"  "1.5" "2.5" "4"
```

```
## std_dev "0.3" "2"      "0.5"    "1.5"    "4"
## color   "red"  "green"  "yellow"  "purple" "black"
```

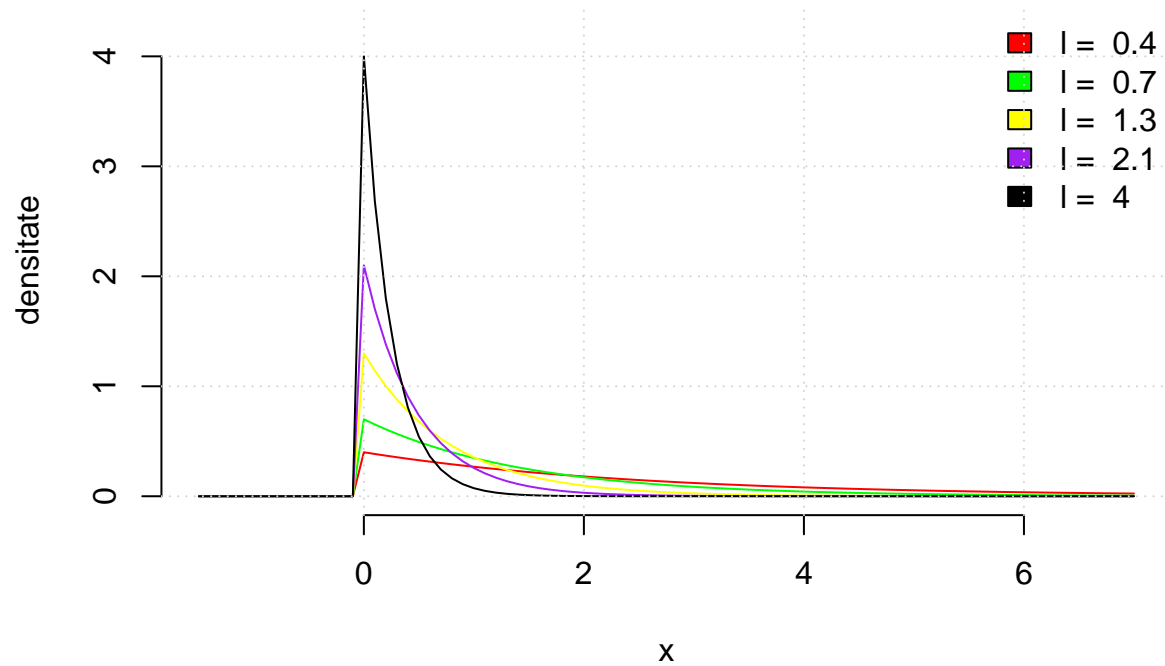
Avand seturile de parametri, trasăm graficele funcțiilor de masă, respectiv de densitate

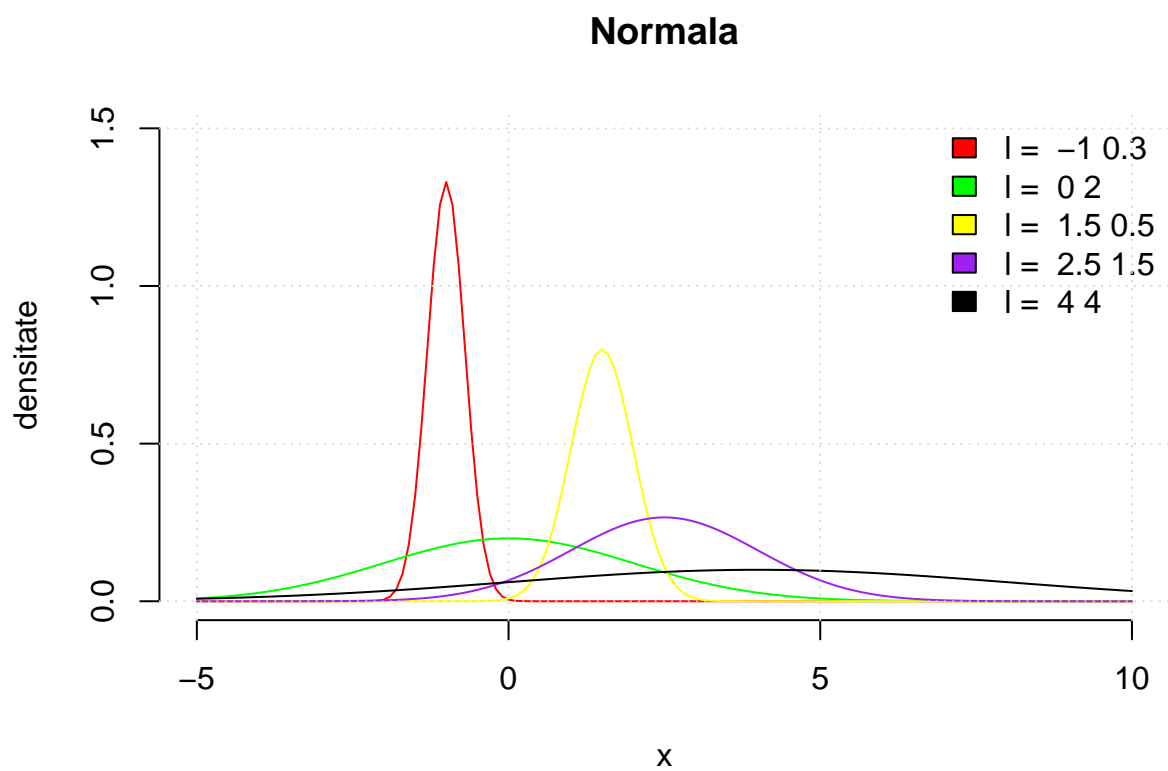


Poisson



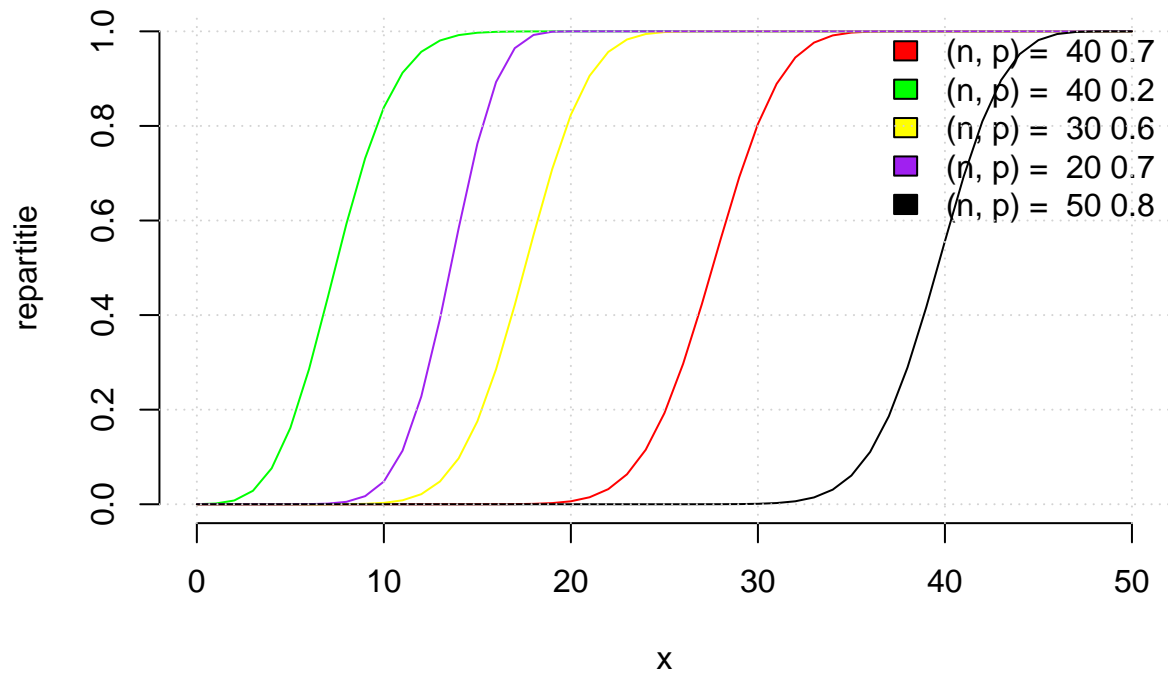
Exponentialia

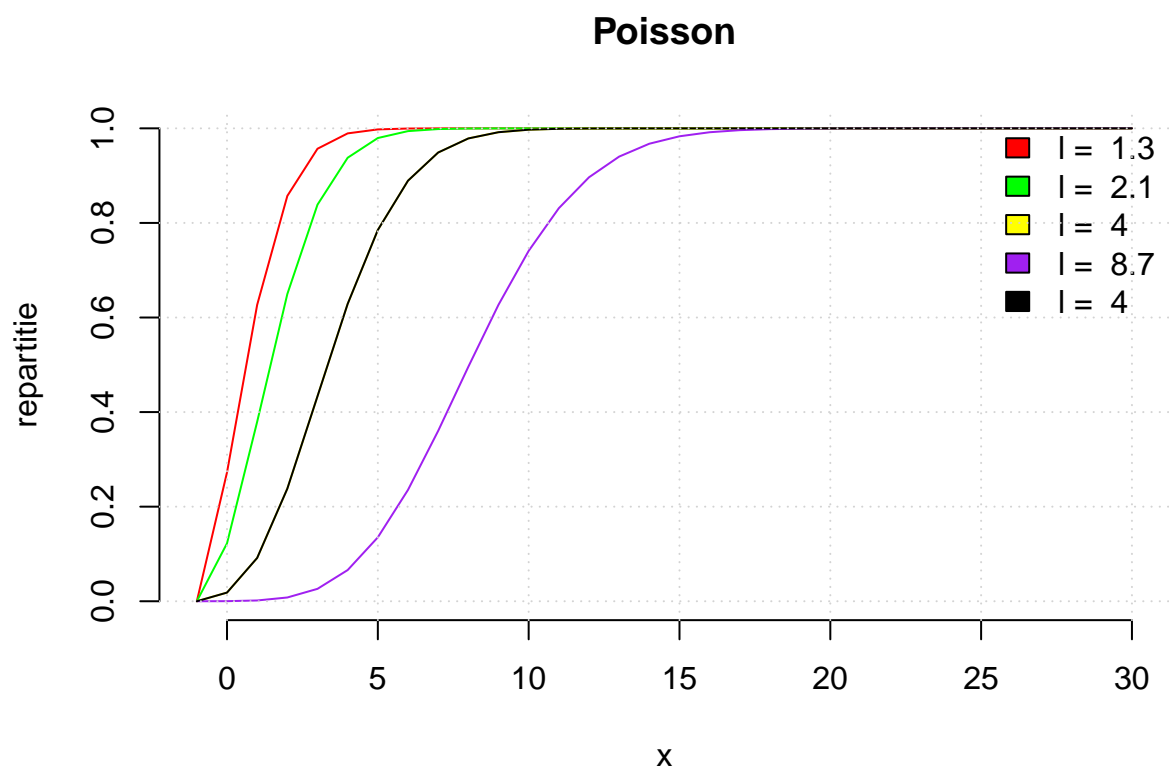




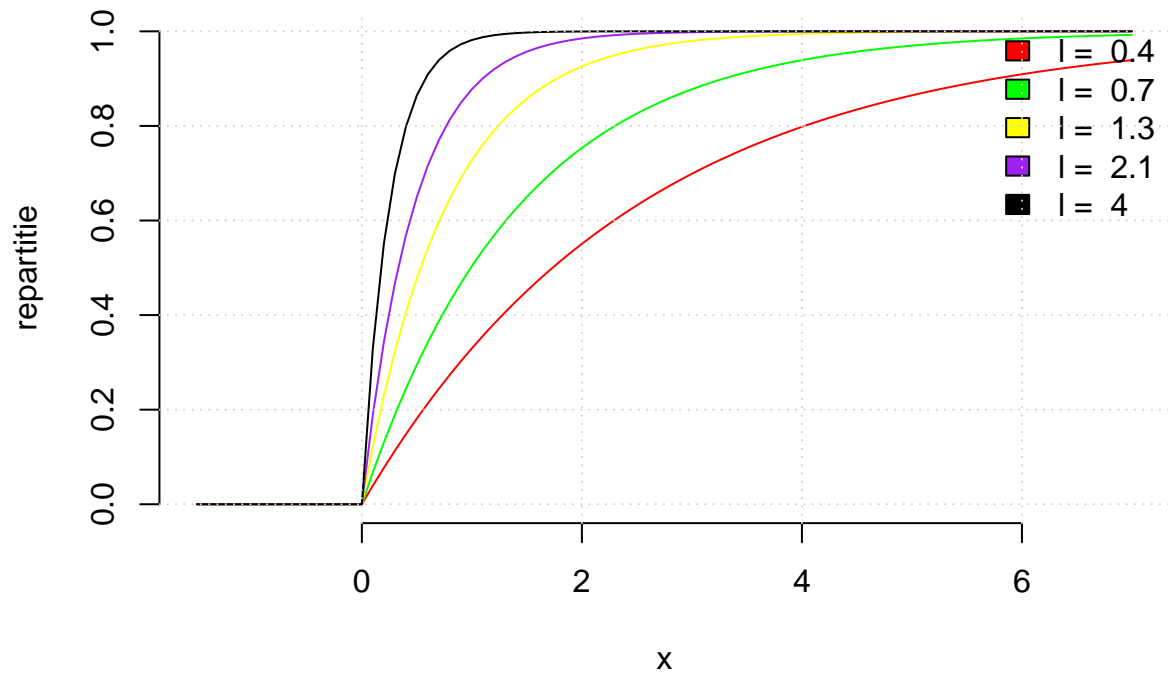
3. Pentru fiecare dintre seturile de parametri considerați, trasați și funcțiile de repartiție

Binomiala





Exponentialia



Normala

