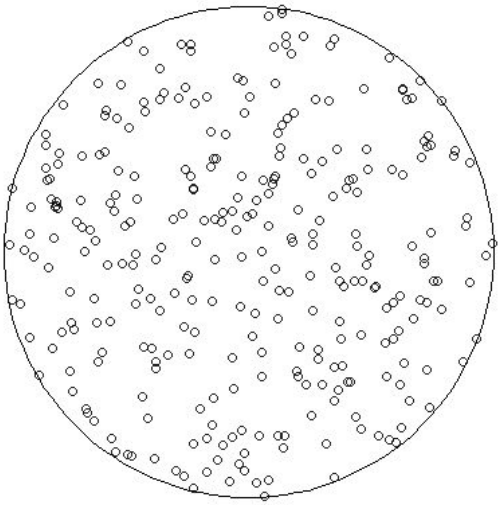
Sprawozdanie
Geostatystyka ćw 6
Relacje pomiędzy punktami. Funkcje G(r) i K(r)
Natalia Gadocha 304165
Geoinformatyka II

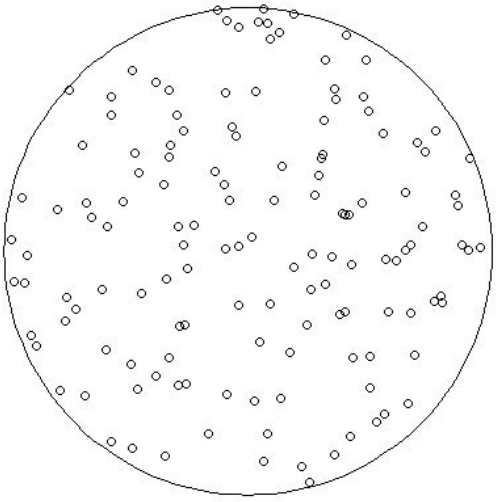
1.

```
p_poisson <- runifdisc(300)
plot(p_poisson)

p_regular <- rStrauss(50, 1, 10, disc())
plot(p_regular)

p_cluster <- rThomas(3, 0.2, 10, disc())
plot(p_cluster)
```

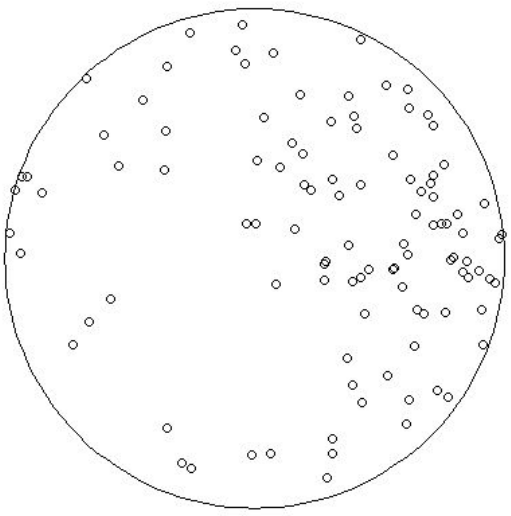
p_poisson



p_regular

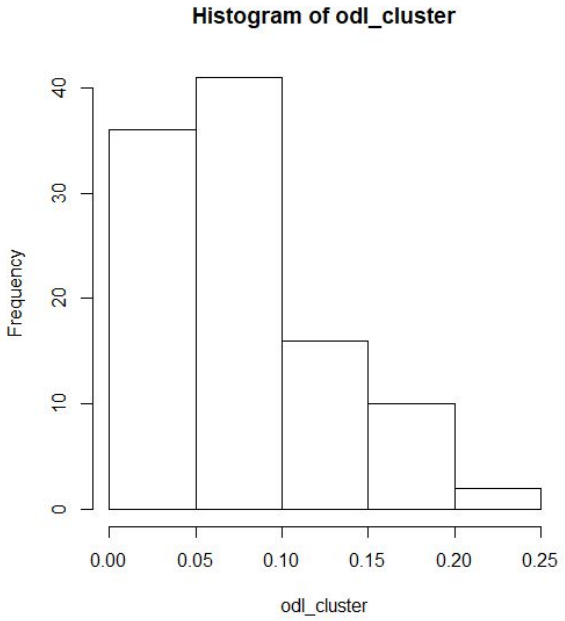


p_cluster



2.

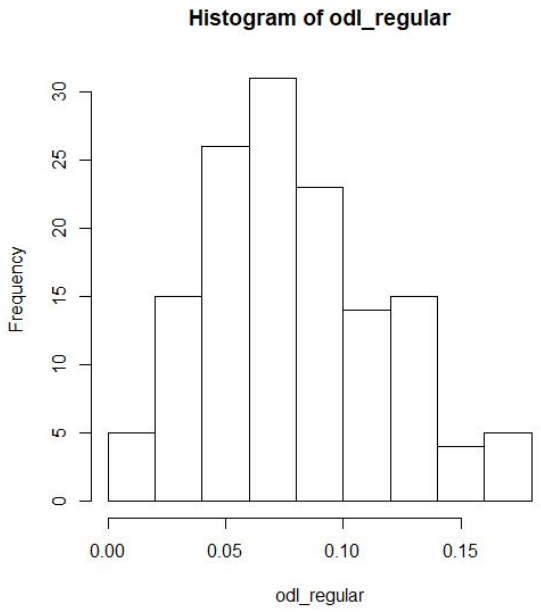
```
odl_cluster <- nndist(p_cluster)
hist(odl_cluster)
```




```
> hist(odl_regular)
>  odl_cluster
  [1] 0.030701696 0.055602942 0.047609144 0.123935870 0.058071352 0.033355001 0.080358133 0.024795745 0.024795745 0.138102671
 [11] 0.030701696 0.068786650 0.111415992 0.084344266 0.037711917 0.093207949 0.021958567 0.039443473 0.061675211 0.080552832
 [21] 0.055642023 0.068786650 0.019277332 0.047609144 0.071973988 0.047720313 0.116835358 0.050100591 0.007533044 0.119908643
 [31] 0.047872931 0.136852824 0.163766026 0.155681853 0.113979752 0.113979752 0.046116304 0.207377251 0.043979734 0.085155341
 [41] 0.046116304 0.059059302 0.073623439 0.075766244 0.039315064 0.039315064 0.075766244 0.155763599 0.039443473 0.158671959
 [51] 0.036706601 0.096553971 0.039231775 0.194886555 0.039231775 0.151572841 0.096553971 0.065641993 0.011647062 0.055642023
 [61] 0.095973411 0.062405228 0.133012571 0.081830155 0.109724222 0.033355001 0.085545754 0.007533044 0.095634599 0.081830155
 [71] 0.138576743 0.012515822 0.011647062 0.036706601 0.099399608 0.088187881 0.060283340 0.092548977 0.019277332 0.124808489
 [81] 0.092548977 0.023821448 0.239737399 0.099399608 0.050798410 0.062405228 0.128886062 0.157050978 0.120934316 0.064802446
 [91] 0.108292221 0.161040954 0.064802446 0.073623439 0.037711917 0.031419342 0.052472234 0.012515822 0.052472234 0.021958567
[101] 0.023821448 0.151572841 0.163766026 0.136852824 0.050798410
> 
```

```
odl_regular <- nndist(p_regular)
hist(odl_regular)
```

```
[101] 0.023821448 0.151572841 0.163766026 0.136852824 0.050798410
>  odl_regular
  [1] 0.09295699 0.10081992 0.17702677 0.02190604 0.06256702 0.04370355 0.10444163 0.10444163 0.06256702 0.06632477 0.13139183
 [12] 0.09339543 0.04446771 0.09288355 0.11805385 0.04446771 0.04370355 0.08983228 0.08682233 0.03412386 0.12052916 0.12182578
 [23] 0.08983228 0.09295699 0.02190604 0.13606595 0.08682233 0.03412386 0.13923887 0.06583937 0.17353468 0.09288355 0.08101702
 [34] 0.08071418 0.10521813 0.06307025 0.05605094 0.07728687 0.07006619 0.04792838 0.06884307 0.06884307 0.08101702 0.11963750
 [45] 0.04044329 0.11765339 0.04044329 0.06468169 0.17368062 0.05880645 0.07046964 0.06583937 0.04792838 0.07006619 0.06468169
 [56] 0.12606760 0.11364929 0.05605094 0.15280498 0.05242038 0.05242038 0.06307025 0.07543504 0.07543504 0.06703035 0.13387044
 [67] 0.09290383 0.04336544 0.07772982 0.04495444 0.13207935 0.17317397 0.02537945 0.13207935 0.07068824 0.04495444 0.06732407
 [78] 0.10780766 0.09624676 0.11564444 0.07772982 0.02048816 0.04336544 0.02048816 0.10470391 0.12041157 0.06703035 0.07068824
 [89] 0.09624676 0.11564444 0.09290383 0.13139183 0.09442973 0.06732407 0.08953991 0.02537945 0.03241580 0.10470391 0.11052422
[100] 0.04286384 0.12606760 0.04672820 0.12582392 0.14104877 0.14104877 0.06312746 0.04356571 0.07076794 0.04578017 0.03586493
[111] 0.08969998 0.01039397 0.09594640 0.01039397 0.16443667 0.08507966 0.13044900 0.03585237 0.07001036 0.15322321 0.04286384
[122] 0.01709078 0.06083016 0.01883252 0.03585237 0.04672820 0.02944720 0.03586493 0.06918089 0.09439393 0.08672446 0.04473154
[133] 0.06312746 0.01709078 0.04473154 0.13044900 0.02944720 0.04356571
>
```



3.

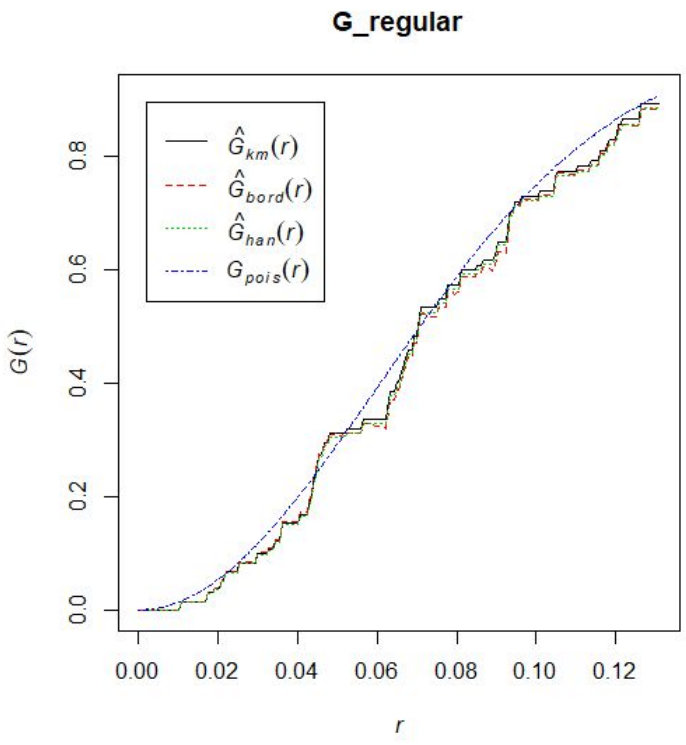
```
G_poisson = Gest(p_poisson)
G_regular = Gest(p_regular)

G_poisson
G_regular
```

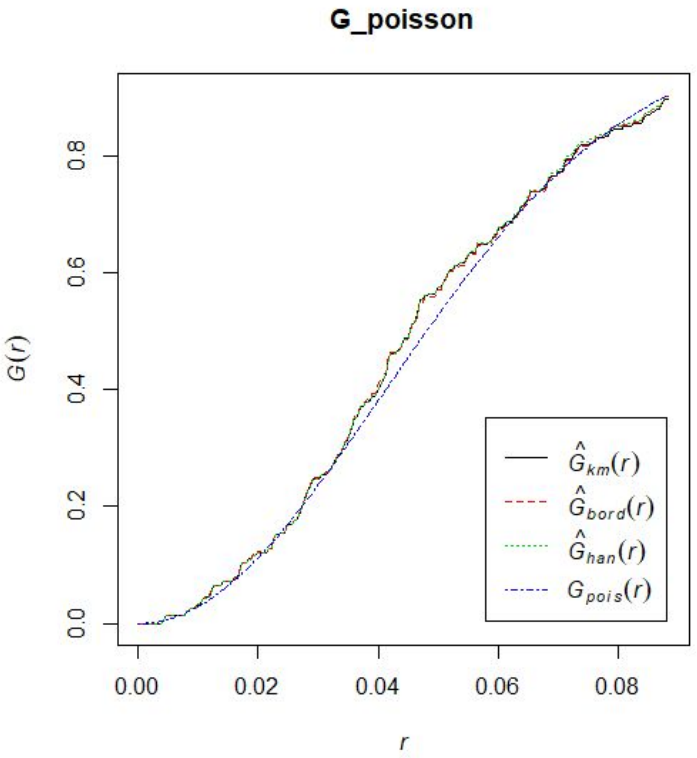
```
> G_poisson
Function value object (class 'fv')
for the function r -> G(r)
.....................................................................
        Math.label      Description
r       r               distance argument r
theo    G[pois](r)      theoretical Poisson G(r)
han     hat(G)[han](r)  Hanisch estimate of G(r)
rs      hat(G)[bord](r) border corrected estimate of G(r)
km      hat(G)[km](r)   Kaplan-Meier estimate of G(r)
hazard  hat(h)[km](r)   Kaplan-Meier estimate of hazard function h(r)
theohaz h[pois](r)      theoretical Poisson hazard function h(r)
.....................................................................
Default plot formula:  .~r
where "." stands for 'km', 'rs', 'han', 'theo'
Recommended range of argument r: [0, 0.088366]
Available range of argument r: [0, 0.19586]
>
```

```
> G_regular
Function value object (class 'fv')
for the function r -> G(r)
.....................................................................
        Math.label      Description
r       r               distance argument r
theo    G[pois](r)      theoretical Poisson G(r)
han     hat(G)[han](r)  Hanisch estimate of G(r)
rs      hat(G)[bord](r) border corrected estimate of G(r)
km      hat(G)[km](r)   Kaplan-Meier estimate of G(r)
hazard  hat(h)[km](r)   Kaplan-Meier estimate of hazard function h(r)
theohaz h[pois](r)      theoretical Poisson hazard function h(r)
.....................................................................
Default plot formula:  .~r
where "." stands for 'km', 'rs', 'han', 'theo'
Recommended range of argument r: [0, 0.13085]
Available range of argument r: [0, 0.28878]
>
```

4.

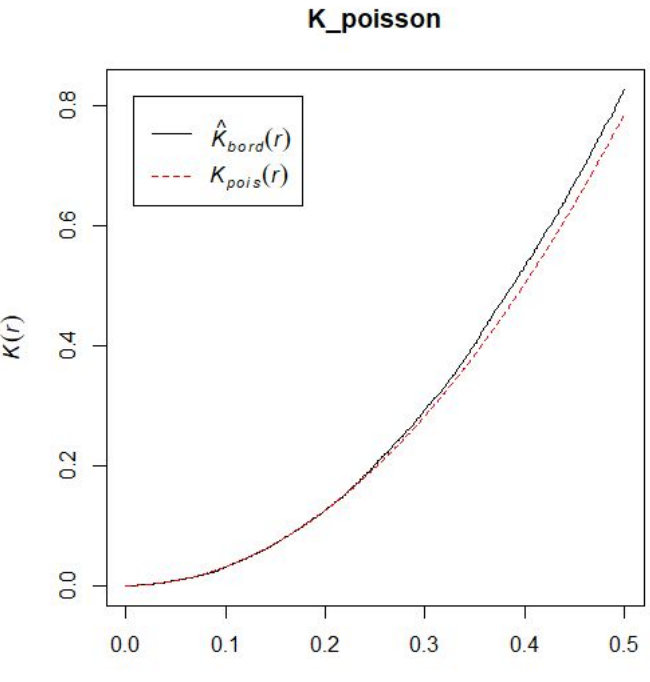
```
plot(G_regular)
plot(G_poisson)
```

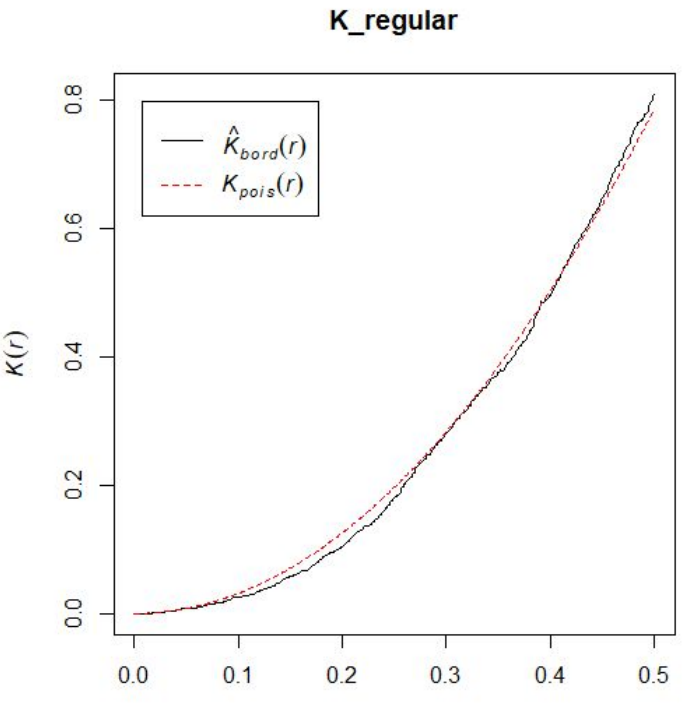


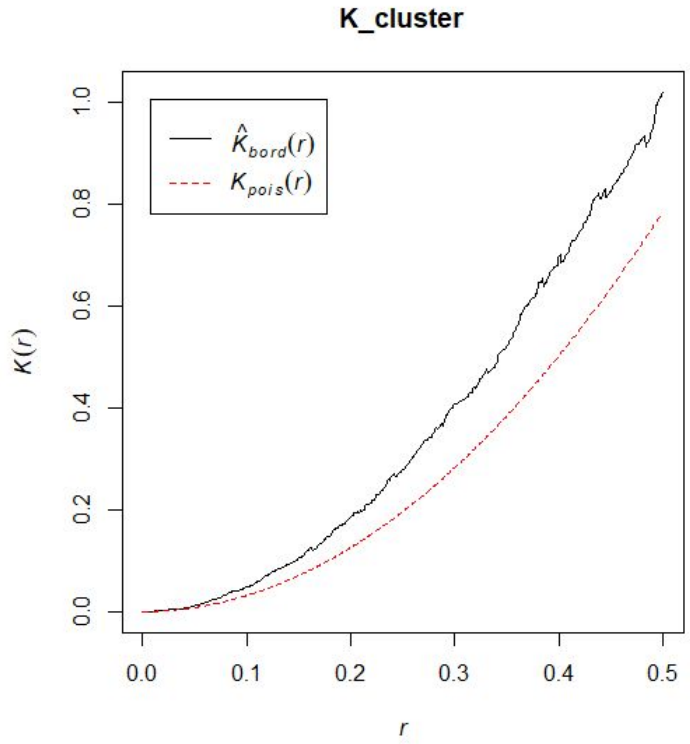


5.

```
K_poisson <- Kest(p_poisson, correction = "border")
K_regular <- Kest(p_regular, correction = "border")
K_cluster <- Kest(p_cluster, correction = "border")

 plot(K_poisson, .~ r)
 plot(K_regular, .~ r)
 plot(K_cluster, .~ r)
```

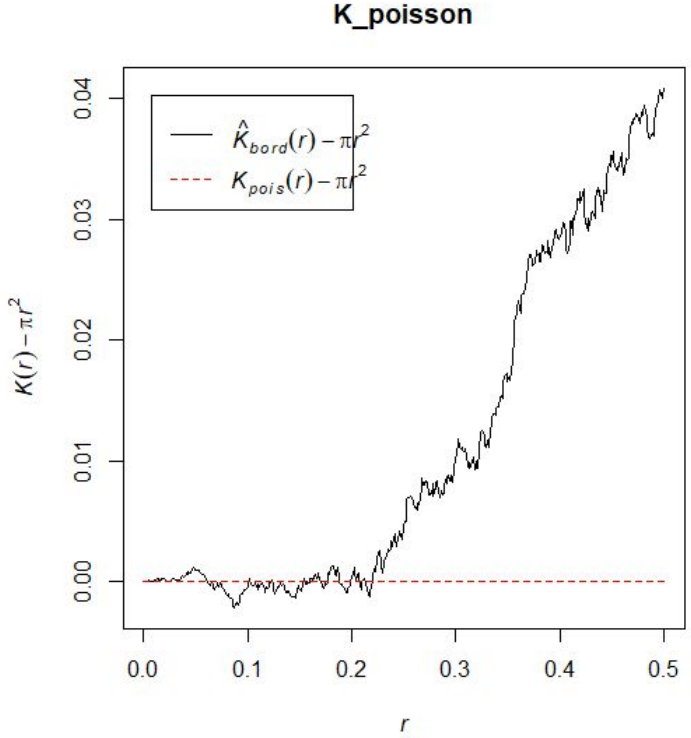


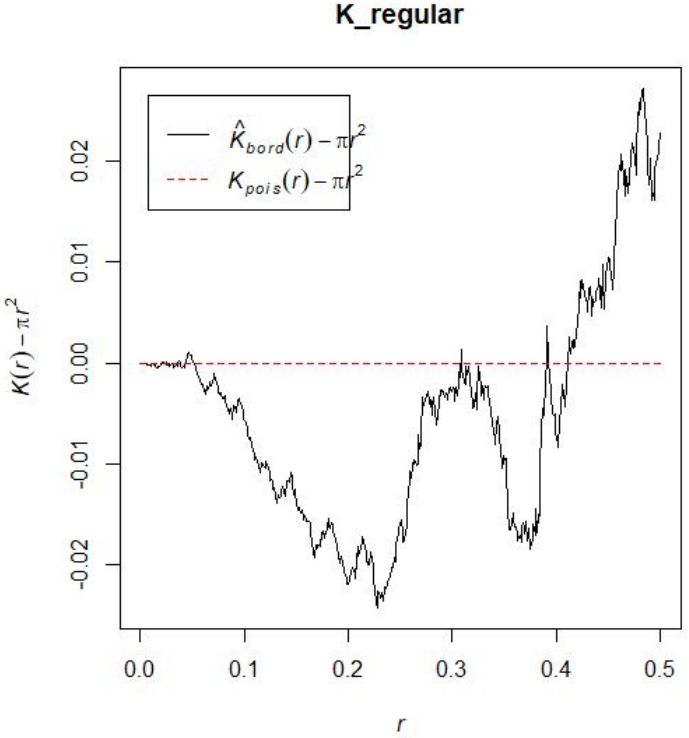


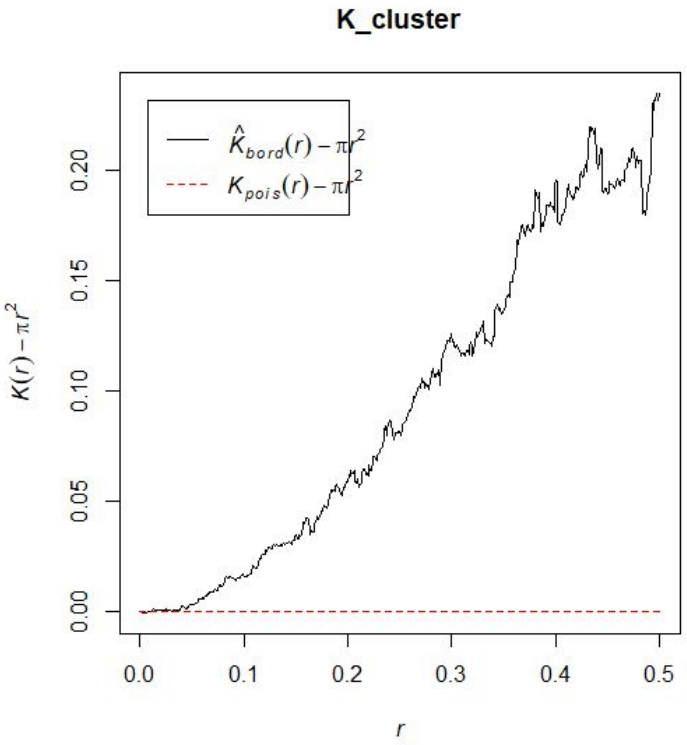


6.

```
plot(K_poisson,  .-pi*r^2~ r)
plot(K_regular,  .-pi*r^2~ r)
plot(K_cluster,  .-pi*r^2~ r)
```

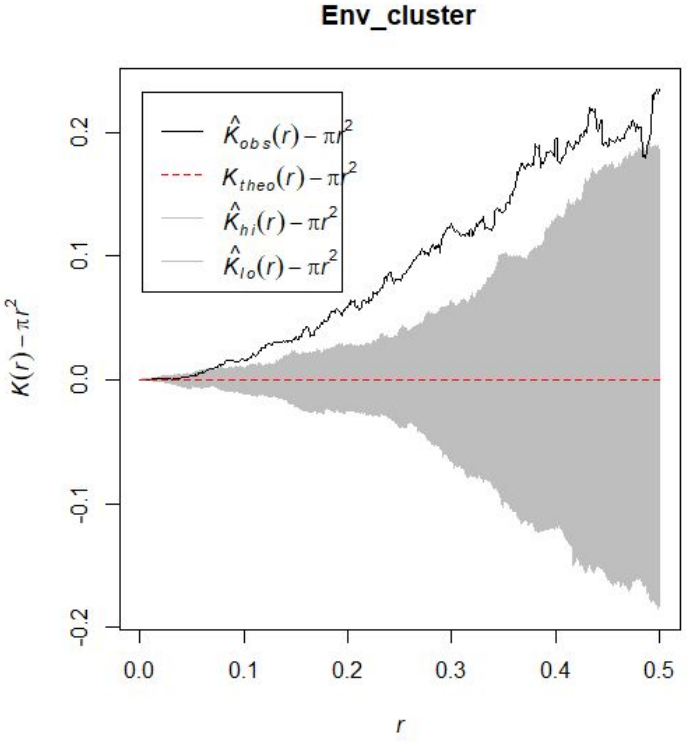






7.

```
Env_cluster <- envelope(p_cluster, Kest, correction = "border" )
plot(Env_cluster, .-pi*r^2~ r)
```



8.

```
Env_regular <- envelope(p_regular, Kest, correction = "border" )
plot(Env_regular,  .-pi*r^2~ r)
```