

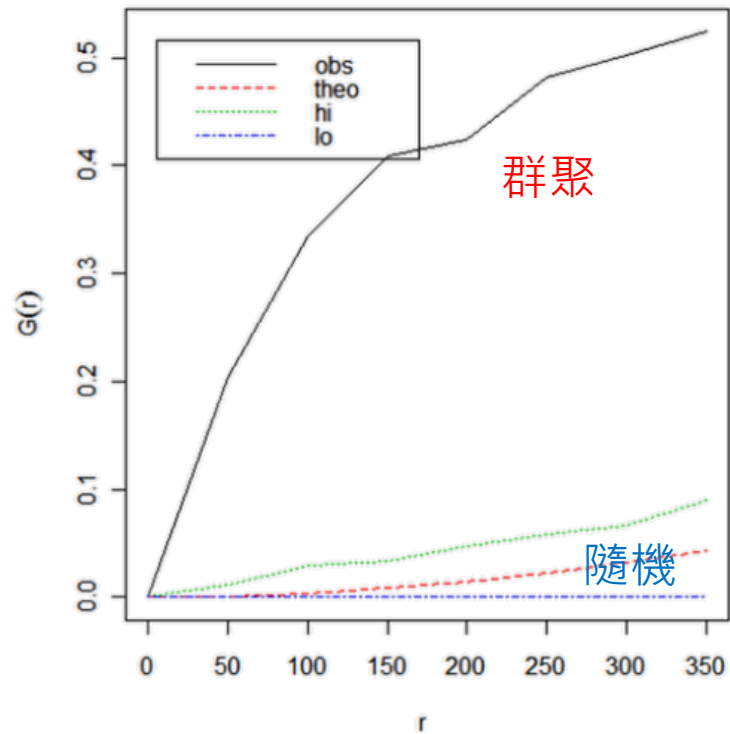
DISTANCE-BASED METHODS

計量地理學及實習 2018.11.30 杜承軒

G function

事件點 → 事件點

從事件點出發找最近的事件點

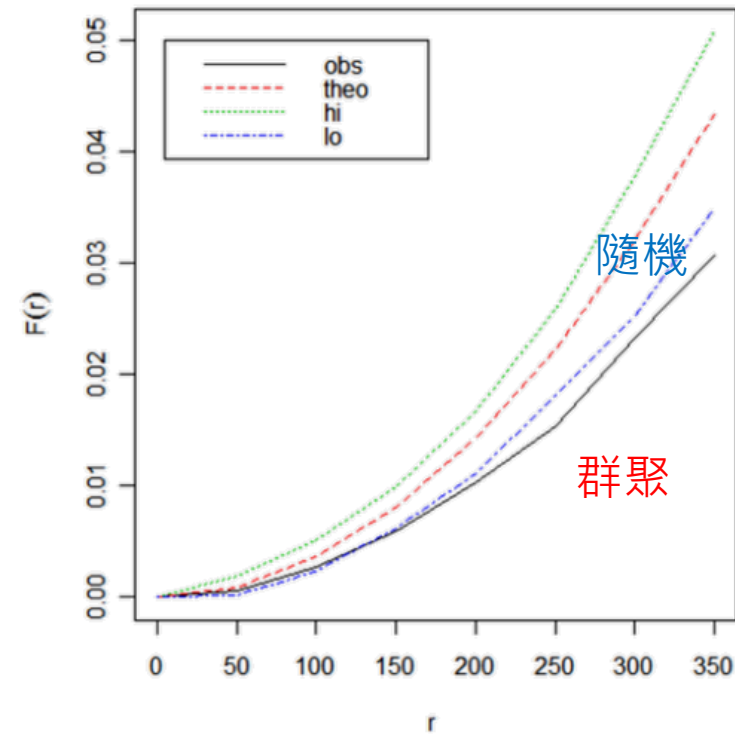


```
nnd=nndist(A.ppp)  
G = ecdf(nnd)
```

F function

隨機點 → 事件點

從隨機點出發找最近的事件點



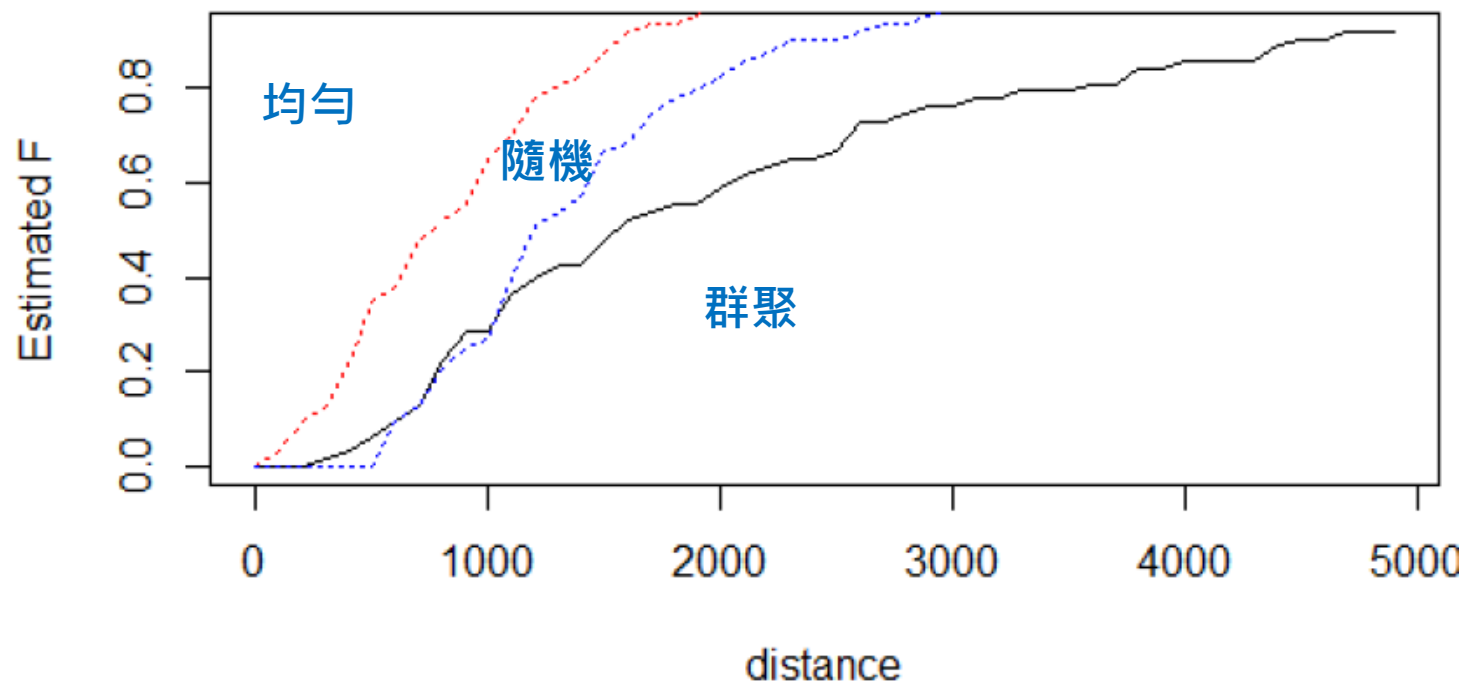
```
nnd=nncross(Radom.ppp, A.ppp)  
F = ecdf(nnd)
```

MonteCarlo: A.ppp → 隨機模擬

Univariate F function

隨機點 → 事件點

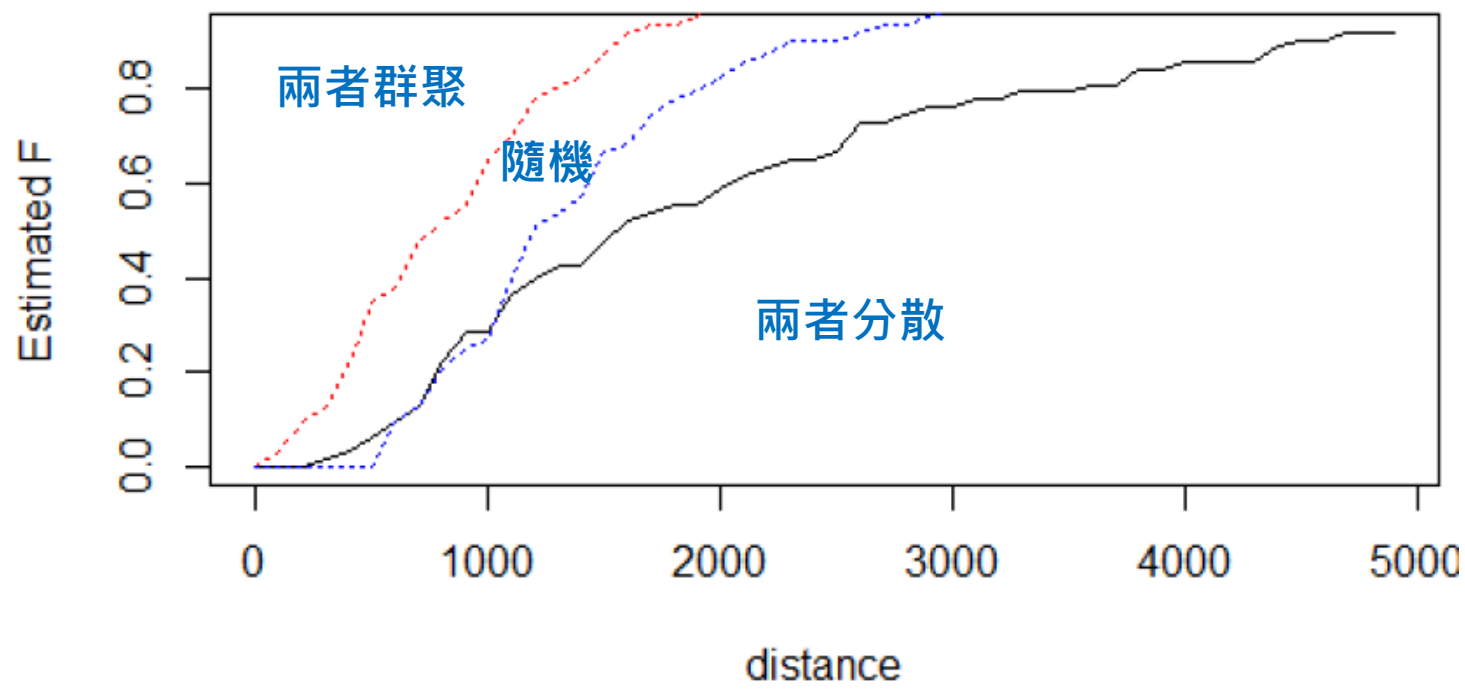
※ 事件是否群聚？



Bivariate F function

A事件點 → B事件點

※ A是否鄰近於B？



F function

Step 1: Read file, convert to **ppp**.

Step 2: Generating Random Points. **rpoint()**

Step 3: Calculate nearest distance. **nncross()**

Step 4: Calculate $F(d)$: **ecdf()**

Step 5: **Monte Carlo Significance Test**: for-loop

Step 6: plotting the CDF curve: **plot()**

```
nnd=nncross(Radom.ppp, A.ppp)
F = ecdf(nnd)
```

Monte Carlo Significance Test

Repeat "**Radom2.ppp**"

```
nnd=nncross(Radom.ppp, Radom2.ppp)
```

```
F = ecdf(nnd)
```

K function

Calculate K(d)

1. 每個點產生距離d的環域
2. 計算環域中不含自己的點
3. 加總計算的數值，除以點個數
4. 除以點密度（點個數／面積）

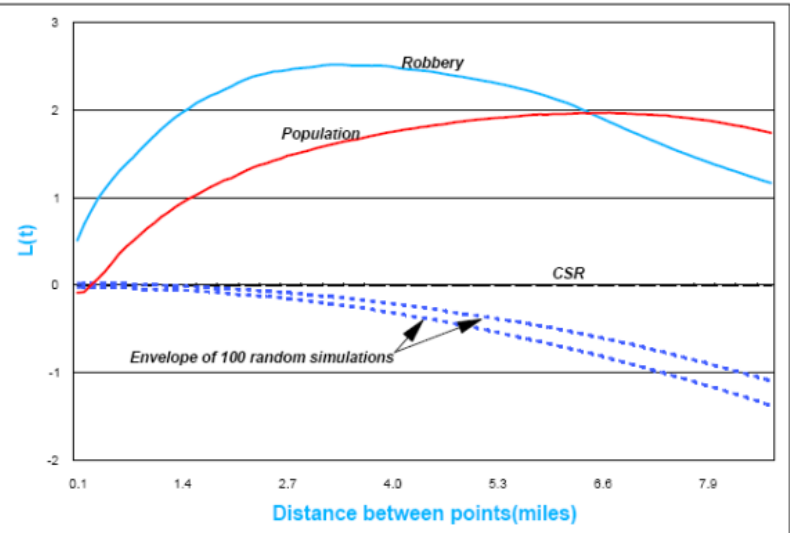
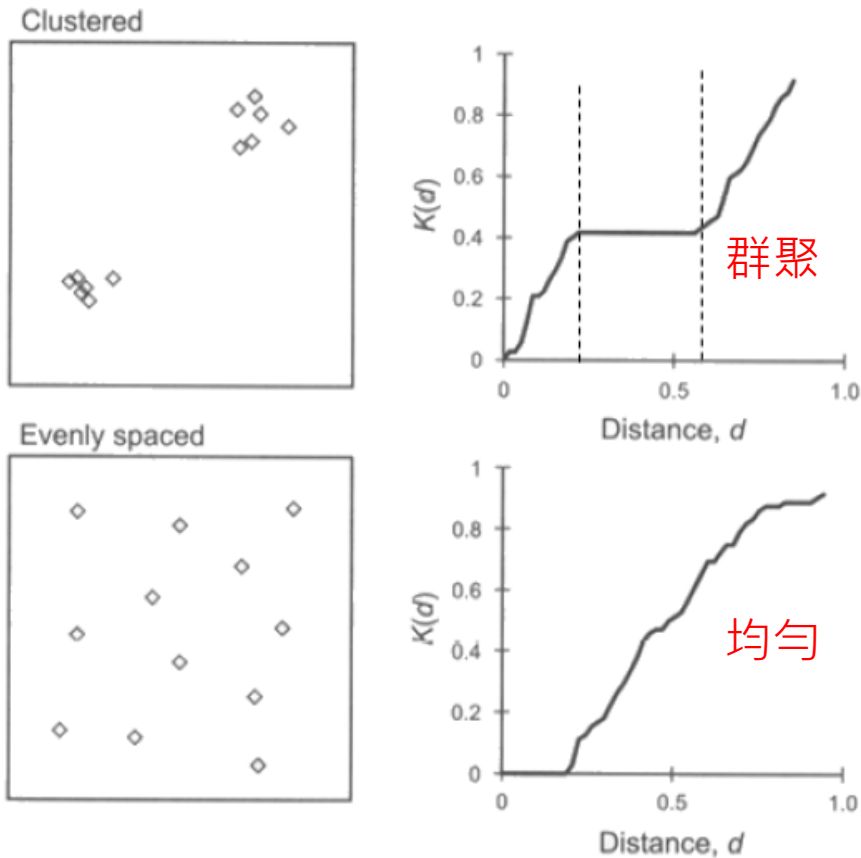
$$K = Kest(A.ppp)$$

L function

$$L(d) = \sqrt{\frac{K(d)}{\pi}} - d$$

在完全隨機分布 (CSR) 下, $L(d)=0$

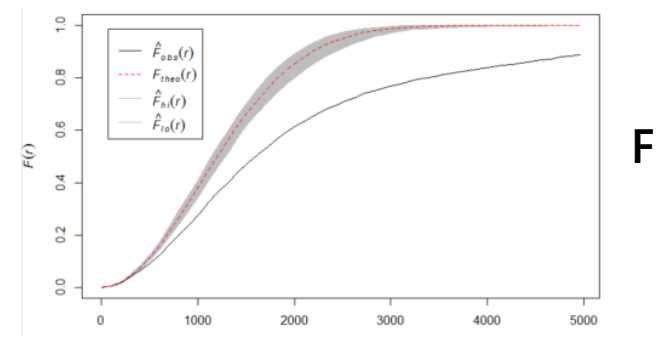
$$L = Lest(A.ppp)$$
$$L_{iso} - L_r$$



Confidence Envelope

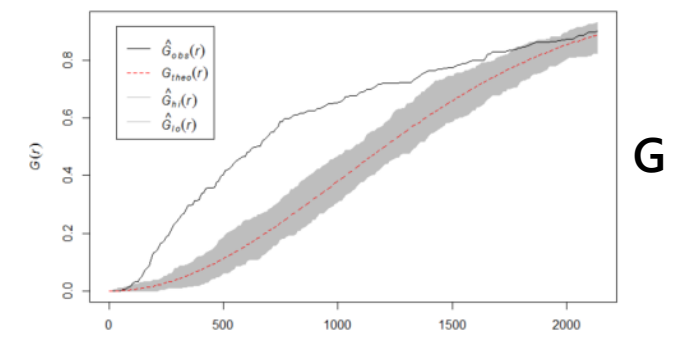
F function

CI=envelope(SH.ppp, **Fest**, **nsim=99**, **nrank=1**)



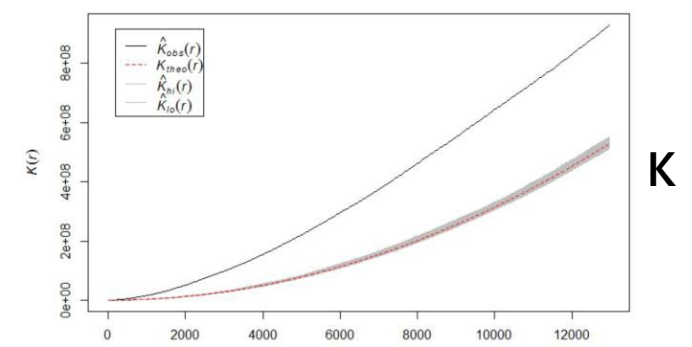
G function

CI=envelope(SH.ppp, **Gest**, nsim=99, nrank=1)



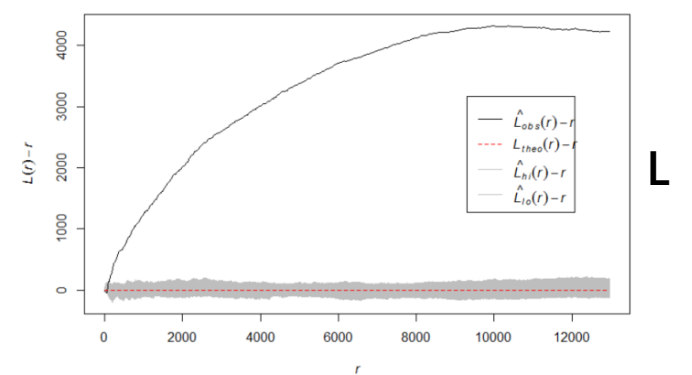
K function

CI=envelope(SH.ppp, **Kest**, nsim=99, nrank=1)



L function

CI=envelope(SH.ppp, **Lest**, nsim=99, nrank=1)
plot(CI)
plot(CI,.-r~r)



模擬99次 取前後1個

↓ ↓