① $$\xi_{H}^{(2)}(r) = \frac{DD(r)\,RR(r)}{DR(r)^2}$$ ② $$\xi_{LZ}^{(2)}(r) = 1 + \frac{1}{N_{est}^2}\frac{DD(r)}{RR(r)} - 2\frac{1}{N_{est}}\frac{DR(r)}{RR(r)}$$

Se tiene que.

$$\underbrace{n = \bar{n}(\delta+1)}_{Ⓐ}, \quad \underbrace{\delta = \frac{\langle w(r)\,\delta(r)\rangle}{\langle w(r)\rangle}}_{Ⓑ}, \quad \underbrace{\psi = \frac{\langle\langle w(r)\,w(r)\,\delta(r)\rangle\rangle}{\langle\langle w(r)\,w(r)\rangle\rangle}}_{Ⓒ}$$

y $$\underbrace{\xi^{(2)}(r) = \frac{\langle\langle w(r)\,w(r)\,\delta(r)\,\delta(r)\rangle\rangle}{\langle\langle w(r)\,w(r)\rangle\rangle}}_{Ⓓ}$$

Para R: $R = \int w\bar{n}\,dV$

$$R_1R_2 = \int \bar{n}_1 w_1\,dV_1 \int \bar{n}_2 w_2\,dV_2$$

$$R_1R_2 = \iint \bar{n}^2\, w_1 w_2\, dV_1 dV_2$$

$$= \bar{n}^2 \langle\langle w_1 w_2\rangle\rangle$$

Para D: $D = \int wn\,dV$

$$D_1D_2 = \int n_1 w_1\,dV_1 \int n_2 w_2\,dV_2 \quad \text{Usando } Ⓐ$$

$$D_1D_2 = \iint \bar{n}^2(\delta_1+1)(\delta_2+1)\,w_1 w_2\,dV_1 dV_2$$

Usando Ⓒ, Ⓓ

$$D_1D_2 = \iint \bar{n}^2\left[\delta_1\delta_2 + \delta_1 + \delta_2 + 1\right]w_1 w_2\,dV_1 dV_2$$

$$D_1D_2 = \bar{n}^2 \iint \left[\delta_1\delta_2 w_1 w_2 + \delta_1 w_1 w_2 + \delta_2 w_1 w_2 + w_1 w_2\right] dV_1 dV_2$$

$$D_1D_2 = \bar{n}^2\left[\xi^{(2)}\langle\langle w_1 w_2\rangle\rangle + \psi_1\langle\langle w_1 w_2\rangle\rangle + \psi_2\langle\langle w_1 w_2\rangle\rangle + \langle\langle w_1 w_2\rangle\rangle\right]$$

Para $D$ y $R$: $D = \int W n \, dV$, $R = \int W \bar{n} \, dV$

$$D_1 R_1 = \int W_1 n_1 \, dV_1 \int W_1 \bar{n}_1 \, dV_1$$

$$= \int W_1 W_2 \bar{n}^2 (\delta_1 + 1) \, dV_1 = \int \bar{n}^2 W_1^2 \delta_1 \, dV_1 + \int \bar{n}^2 W_1^2 \, dV_1$$

$$= (1 + \psi_1) \bar{n}^2 \langle\langle W_1 W_2 \rangle\rangle$$

$$\Rightarrow \cdot D_1 D_2 R_1 R_2 = (\xi^{(2)} + 1 + \psi_1 + \psi_2)(R_1 R_2)^2$$

$$\cdot (D_1 R_1)^2 = \bar{n}^2 (1 + \psi_1)^2 \langle\langle W_1 W_2 \rangle\rangle^2$$

$$= (1 + \psi_1)^2 (R_1 R_2)^2$$

- $$\xi_H^{(2)} = \frac{DD \; RR}{(DR)^2} = \frac{(\xi^{(2)} + 1 + \psi_1 + \psi_2) \cancel{(R_1 R_2)^2}}{(1 + \psi_1)^2 \cancel{(R_1 R_2)^2}}$$

$$\boxed{\xi_H^2 = \frac{(\xi^{(2)} + 1 + \psi_1 + \psi_2)}{(1 + \psi_1)^2}}$$ Hamilton

- $$\xi_{LZ}^{(2)} = 1 + \frac{1}{N_{est}^2} \frac{DD}{RR} - 2 \frac{1}{N_{est}} \frac{DR}{RR}$$

$$= 1 + \frac{1}{(1+\bar{\delta})} \frac{(\xi^{(2)} + 1 + \psi_1 + \psi_2) \cancel{R_1 R_2}}{\cancel{R_1 R_2}} - \frac{2}{(1+\bar{\delta})} \frac{(1 + \psi_1) \cancel{R_1 R_2}}{\cancel{R_1 R_2}}$$

$$\boxed{\xi_{LZ}^{(2)} = 1 + \frac{1}{(1+\bar{\delta})} (\xi^{(2)} + 1 + \psi_1 + \psi_2) - \frac{2}{(1+\bar{\delta})} (1 + \psi_1)}$$ Landy - Szalay

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