$$\frac{Z(s)}{\|Z(s)\|} = \frac{\hat{\mu}}{\hat{\sigma}} = \boxed{\cancel{\frac{\hat{\mu}}{\frac{1}{\sqrt{n}}\hat{\sigma}}}} \qquad \frac{Y_i}{\sqrt{\sum Y_i^2}}$$

$$\cancel{\frac{\hat{\mu}}{\hat{\sigma}}} \qquad \boxed{\frac{Y_i}{\hat{\sigma}}} \qquad \frac{Y_i - \hat{\mu}}{\hat{\sigma}} = R_i$$

$$\boxed{\frac{Y_i}{\sum Y_i^2}} \qquad \cancel{cov} \quad cov \Big(\qquad \hat{\sigma} = \sqrt{\frac{1}{n} \sum (Y_i - \hat{\mu})^2}$$

in ID

$$\det(\Lambda(s))^{1/2} \qquad \hat{\Lambda}(s) = \frac{1}{n} \sum_{i=1}^{n} R_i'(s)^2 \qquad u(s)$$

$$\Rightarrow \cancel{FA} \Rightarrow \boxed{\hat{\Lambda}(s) = \sum_{i=1}^{n} \left(\frac{1}{\sqrt{n}} R_i'(s)\right)^2} \quad u$$

$$\hat{\Lambda}(s) = \boxed{\sum_{i=1}^{n} R_i'(s)^2} \qquad \boxed{\sum_{i=1}^{n} R_i' R_i^T} \qquad \frac{Z}{\|Z\|} = \frac{\sqrt{n}\,R}{\|R\|}$$

$$(u_1 \cdots u_n) \begin{pmatrix} u_1 \\ \vdots \\ u_n \end{pmatrix} = \sum u_i(s)^2 \qquad \sqrt{n}\,R_i =$$

$$\begin{pmatrix} u_1 \\ \vdots \\ u_n \end{pmatrix} (u_1 \cdots u_n) = \begin{pmatrix} u_1 u_1 & u_1 u_2 & \cdots \\ & u_2 u_2 & \end{pmatrix}$$