

$$\begin{aligned}
 (1+F_L) \cdot \bar{v}_u^2 &= \frac{1}{4}(1+F_S) \bar{v}_u^2 + \frac{1}{4}(1+F_D) \cdot \bar{v}_u^2 + \text{var}(m_i) \\
 &\quad + \frac{1}{2} A_{sd} \cdot \bar{v}_u^2 \\
 &= \frac{1}{4} \bar{v}_u^2 (1+F_S) + \frac{1}{4} \bar{v}_u^2 (1+F_D) + \underbrace{\text{var}(m_i)}_{(D)_{ii} \bar{v}_u^2} \\
 &\quad + \frac{1}{2} \cdot 2F_L \cdot \bar{v}_u^2
 \end{aligned}$$

$$\begin{aligned}
 \text{var}(m_i) &= (1+F_L) \bar{v}_u^2 - F_L \bar{v}_u^2 - \frac{1}{4} \bar{v}_u^2 (1+F_S) \\
 &\quad - \frac{1}{4} \bar{v}_u^2 (1+F_D)
 \end{aligned}$$

$$\begin{aligned}
 &\bar{v}_u^2 - \frac{1}{4} \bar{v}_u^2 (1+F_S) - \frac{1}{4} \bar{v}_u^2 (1+F_D) \\
 &= \bar{v}_u^2 \left[ 1 - \frac{1}{4} - \frac{1}{4} F_S - \frac{1}{4} - \frac{1}{4} F_D \right] \\
 &= \bar{v}_u^2 \left[ \frac{1}{2} - \frac{1}{4} (F_S + F_D) \right]
 \end{aligned}$$