

$$i := 1 \dots n \quad nint := 1 \quad n := 3 \cdot nint \quad n = 3 \quad j := 1 \dots n$$

$$\begin{array}{l}
 mx := \text{for } i \in 1 \dots n \\
 \quad \left\| \begin{array}{l} mx_{1,i} \leftarrow 1 \\ mx \end{array} \right\| \\
 \\
 mx = \begin{bmatrix} 1 & 1 & 1 \end{bmatrix} \\
 \\
 v := \text{for } i \in 1 \dots n \\
 \quad \left\| \begin{array}{l} v_{1,i} \leftarrow 1 \\ v \end{array} \right\| \\
 \\
 v = \begin{bmatrix} 1 & 1 & 1 \end{bmatrix} \\
 \\
 \rho := \text{for } i \in 1 \dots n \\
 \quad \left\| \begin{array}{l} \text{for } j \in 1 \dots n \\ \quad \left\| \begin{array}{l} \text{if } i = j \\ \quad \left\| \begin{array}{l} \rho_{i,j} \leftarrow 1 \\ \rho \end{array} \right\| \\ \quad \text{else} \\ \quad \left\| \begin{array}{l} \rho_{i,j} \leftarrow 0.5 \\ \rho \end{array} \right\| \end{array} \right\| \end{array} \right\|
 \end{array}$$

$$\rho = \begin{bmatrix} 1 & 0.5 \\ 0.5 & 1 \\ 0.5 & 0.5 \end{bmatrix}$$

$$\Sigma := \rho$$

Aofficial :

$$\Sigma = \begin{bmatrix} 1 & 0.5 & 0.5 \\ 0.5 & 1 & 0.5 \\ 0.5 & 0.5 & 1 \end{bmatrix} \quad A := \begin{bmatrix} 4 & -2 & 1 \\ 2 & 5 & -1 \end{bmatrix}$$

$$I := \begin{bmatrix} 1 & nint + 1 & nint \cdot 2 + 1 \end{bmatrix}$$

$$I = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$$

\_\_\_\_ V[Y] and E[Y] \_\_\_\_\_

$$\begin{array}{l}
 V := A \cdot \Sigma \cdot A^T \quad V = \begin{bmatrix} 15 & 7.5 \\ 7.5 & 33 \end{bmatrix} \quad l := 1 \dots 2 \quad a \leftarrow \sqrt{V} \\
 \\
 V = \begin{bmatrix} 15 & 7.5 \\ 7.5 & 33 \end{bmatrix} \quad mY := A \cdot mx^T \\
 \\
 mY = \begin{bmatrix} 3 \\ 6 \end{bmatrix} \quad V = \begin{bmatrix} 15 & 7.5 \\ 7.5 & 33 \end{bmatrix}
 \end{array}$$

\_\_\_\_ Conditional  $\Sigma$  and mcond(x) \_\_\_\_\_

$$\begin{array}{l}
 \Sigma_{cond1} := \left\| \begin{array}{l} k \leftarrow 1 \\ \text{for } j \in (1 \dots n) \\ \quad \left\| \begin{array}{l} \text{for } t \in (1 \dots n) \\ \quad \left\| \begin{array}{l} \Sigma_{t,j} \leftarrow \Sigma_{t,j} - \frac{\Sigma_{t,k} \cdot \Sigma_{k,j}}{\Sigma_{k,k}} \end{array} \right\| \\ \Sigma_{cond1} \leftarrow (A) \cdot \Sigma \cdot A^T \\ \Sigma_{cond1} \end{array} \right\| \end{array} \right\| \\
 \\
 \Sigma_{cond2} := \left\| \begin{array}{l} k \leftarrow 2 \\ \text{for } j \in (1 \dots n) \\ \quad \left\| \begin{array}{l} \text{for } t \in (1 \dots n) \\ \quad \left\| \begin{array}{l} \Sigma_{t,j} \leftarrow \Sigma_{t,j} - \frac{\Sigma_{t,k} \cdot \Sigma_{k,j}}{\Sigma_{k,k}} \end{array} \right\| \\ \Sigma_{cond2} \leftarrow (A) \cdot \Sigma \cdot A^T \\ \Sigma_{cond2} \end{array} \right\| \end{array} \right\|
 \end{array}$$

$$\Sigma_{cond1} = \begin{bmatrix} 2.75 & -6.5 \end{bmatrix} \quad \Sigma_{cond2} = \begin{bmatrix} 14.75 & 4.75 \end{bmatrix} \quad \Sigma_{cond3} = \begin{bmatrix} 11 & 2.5 \end{bmatrix}$$

$$\begin{array}{ccc} \text{---} & [-6.5 & 17 & ] & \text{---} & [ & 4.75 & 2.75 & ] & \text{---} & [ & 2.5 & 26.75 & ] \end{array}$$

$$m1l(x) := \sum_{j=1}^n \left( A_{1,j} \cdot \left( mx_{1,j} + \left( x - mx_{1,j} \right) \cdot \frac{\Sigma_{j,1}}{\Sigma_{1,1}} \right) \right) \qquad m12(x) := \sum_{j=1}^n \left( A_{2,j} \cdot \left( mx_{1,j} + \left( x - mx_{1,j} \right) \cdot \frac{\Sigma_{j,1}}{\Sigma_{1,1}} \right) \right)$$

$$m22(x) := \sum_{j=1}^n \left( A_{2,j} \cdot \left( mx_{1,j} + \left( x - mx_{1,j} \right) \cdot \frac{\Sigma_{j,2}}{\Sigma_{2,2}} \right) \right) \qquad m2l(x) := \sum_{j=1}^n \left( A_{1,j} \cdot \left( mx_{1,j} + \left( x - mx_{1,j} \right) \cdot \frac{\Sigma_{j,2}}{\Sigma_{2,2}} \right) \right)$$

here

$$m3l(x) := \sum_{j=1}^n \left( A_{1,j} \cdot \left( mx_{1,j} + \left( x - mx_{1,j} \right) \cdot \frac{\Sigma_{j,3}}{\Sigma_{3,3}} \right) \right) \qquad m32(x) := \sum_{j=1}^n \left( A_{2,j} \cdot \left( mx_{1,j} + \left( x - mx_{1,j} \right) \cdot \frac{\Sigma_{j,3}}{\Sigma_{3,3}} \right) \right)$$

$$d:=2$$

$$cd:=\frac{\textcolor{teal}{\pi}^{\frac{d+1}{2}}}{\Gamma\left(\frac{d+1}{2}\right)} \qquad cd=6.283$$

$$\{\displaystyle e^{\mathrm{i}t\mu-\frac{1}{2}\sigma^2t^2}\}$$

$$mYXl(x) := [m1l(x) \; m12(x)]$$

$$ChY(tl,t2,mY,V) := \textcolor{teal}{e}^{\mathrm{i}i \cdot \left( \left( mY_{1,1} \right) \cdot tl + \left( mY_{1,2} \right) \cdot t2 \right) - \frac{1}{2} \cdot [tl \; t2] \cdot V \cdot \begin{bmatrix} tl \\ t2 \end{bmatrix}} \qquad ChYXl(tl,t2,x,\Sigma condl) := \textcolor{teal}{e}^{\mathrm{i}i \cdot \left( (m1l(x) \right. \right.}$$

$$\textcolor{violet}{ChY}(tl,t2,mY,V) := \left( \cos \left( \left( \left( mY_{1,1} \right) \cdot tl + \left( mY_{1,2} \right) \cdot t2 \right) \right) \right) \cdot \textcolor{teal}{e}^{-\frac{1}{2} \cdot [tl \; t2] \cdot V \cdot \begin{bmatrix} tl \\ t2 \end{bmatrix}} + \mathrm{i}i \cdot \left( \sin \left( \left( \left( mY_{1,1} \right) \cdot tl + \left( mY_{1,2} \right) \cdot t2 \right) \right) \right) \cdot \textcolor{teal}{e}^{-\frac{1}{2} \cdot [tl \; t2] \cdot V \cdot \begin{bmatrix} tl \\ t2 \end{bmatrix}}$$

$$\textcolor{violet}{ChYXl}(tl,t2,x,\Sigma condl) := \left( \cos \left( \left( \left( m1l(x) \right) \cdot tl + \left( m12(x) \right) \cdot t2 \right) \right) \right) \cdot \textcolor{teal}{e}^{-\frac{1}{2} \cdot [tl \; t2] \cdot \Sigma condl \cdot \begin{bmatrix} tl \\ t2 \end{bmatrix}} + \mathrm{i}i \cdot \sin \left( \left( \left( m1l(x) \right) \cdot tl + \left( m12(x) \right) \cdot t2 \right) \right) \cdot \textcolor{teal}{e}^{-\frac{1}{2} \cdot [tl \; t2] \cdot \Sigma condl \cdot \begin{bmatrix} tl \\ t2 \end{bmatrix}}$$

$$Diff1(tl,t2,x) := \left( \cos \left( \left( \left( mY_{1,1} \right) \cdot tl + \left( mY_{1,2} \right) \cdot t2 \right) \right) \right) \cdot \textcolor{teal}{e}^{-\frac{1}{2} \cdot [tl \; t2] \cdot V \cdot \begin{bmatrix} tl \\ t2 \end{bmatrix}} - \cos \left( \left( \left( m1l(x) \right) \cdot tl + \left( m12(x) \right) \cdot t2 \right) \right) \cdot \textcolor{teal}{e}^{-\frac{1}{2} \cdot [tl \; t2] \cdot \Sigma condl \cdot \begin{bmatrix} tl \\ t2 \end{bmatrix}}$$

$$Usef(tl,t2,x) := \left( \cos \left( \left( \left( mY_{1,1} \right) \cdot tl + \left( mY_{2,1} \right) \cdot t2 \right) \right) \right) \cdot \textcolor{teal}{e}^{-\frac{1}{2} \cdot [tl \; t2] \cdot V \cdot \begin{bmatrix} tl \\ t2 \end{bmatrix}} - \cos \left( \left( \left( m1l(x) \right) \cdot tl + \left( m12(x) \right) \cdot t2 \right) \right) \cdot \textcolor{teal}{e}^{-\frac{1}{2} \cdot [tl \; t2] \cdot \Sigma condl \cdot \begin{bmatrix} tl \\ t2 \end{bmatrix}}$$

$$Usef(1,1,1) = 0.001$$

$$Wlinn(r) := \frac{1}{cd} \cdot \int\limits_{-10}^{10} \int\limits_{-10}^{10} \frac{Usef(tl,t2,r)}{\left| tl^2 + t2^2 \right|^{\frac{d+1}{2}}} \mathrm{d}tl \; \mathrm{d}t2$$

$$Wlinn(0.5) = 1.514$$

$$ED1:=\int\limits_{-10}^{10}W1inn(y)\cdot\frac{1}{v_{1,1}\cdot\sqrt{2\cdot\textcolor{brown}{\pi}}}\cdot\textcolor{brown}{e}^{\frac{-1}{2}\cdot\frac{\left(y-mx_{1,1}\right)^2}{\left(v_{1,1}\right)^2}}\mathrm{d}y$$

$$ED1=3.47$$

$$Usef2\left(tl,t2,x\right):=\left(\left(\cos\left(\left(\left(mY_{1,1}\right)\cdot tl+\left(mY_{2,1}\right)\cdot t2\right)\right)\right)\cdot\textcolor{brown}{e}^{\frac{-1}{2}\cdot\left[tl\quad t2\right]\cdot V\cdot\begin{bmatrix}tl\\t2\end{bmatrix}}-\cos\left(\left(\left(m2l\left(x\right)\right)\cdot tl+\left(m22\left(x\right)\right)\cdot t2\right)\right)\cdot\textcolor{brown}{e}^{\frac{-1}{2}\cdot\left[t2\quad tl\right]\cdot V\cdot\begin{bmatrix}tl\\t2\end{bmatrix}}\right)$$

$$W2inn(r):=\frac{1}{cd}\cdot\int\limits_{-5}^5\int\limits_{-5}^5\frac{Usef2\left(tl,t2,r\right)}{\left|tl^2+t2^2\right|^{\frac{d+1}{2}}}\mathrm{d}tl\,\mathrm{d}t2\qquad Usef2\left(1,1,1\right)=1.88\cdot10^{-12}$$

$$W2inn(0.5)=1.556$$

$$ED2:=\int\limits_{-5}^5W2inn(y)\cdot\frac{1}{v_{1,1}\cdot\sqrt{2\cdot\textcolor{brown}{\pi}}}\cdot\textcolor{brown}{e}^{\frac{-1}{2}\cdot\frac{\left(y-mx_{1,1}\right)^2}{\left(v_{1,1}\right)^2}}\mathrm{d}y$$

$$ED2=3.626$$

$$Usef3\left(tl,t2,x\right):=\left(\left(\cos\left(\left(\left(mY_{1,1}\right)\cdot tl+\left(mY_{2,1}\right)\cdot t2\right)\right)\right)\cdot\textcolor{brown}{e}^{\frac{-1}{2}\cdot\left[tl\quad t2\right]\cdot V\cdot\begin{bmatrix}tl\\t2\end{bmatrix}}-\cos\left(\left(\left(m3l\left(x\right)\right)\cdot tl+\left(m32\left(x\right)\right)\cdot t2\right)\right)\cdot\textcolor{brown}{e}^{\frac{-1}{2}\cdot\left[t2\quad tl\right]\cdot V\cdot\begin{bmatrix}tl\\t2\end{bmatrix}}\right)$$

$$W3inn(r):=\frac{1}{cd}\cdot\int\limits_{-5}^5\int\limits_{-5}^5\frac{Usef3\left(tl,t2,r\right)}{\left|tl^2+t2^2\right|^{\frac{d+1}{2}}}\mathrm{d}tl\,\mathrm{d}t2\qquad Usef2\left(1,1,1\right)=1.88\cdot10^{-12}$$

$$W3inn(0.5)=0.271$$

$$\overset{5}{\underset{\textcolor{brown}{f}}{\textcolor{brown}{I}}}$$

$$ED3:=\int\limits_{-5}^{} \left| w3inn(y)\cdot \frac{1}{v_{1,1}\cdot \sqrt{2\cdot \pi}}\cdot e^{\frac{-1}{2}\cdot \frac{\left(y-mx_{1,1}\right)^2}{\left(v_{1,1}\right)^2}}\right| \mathrm{d}y$$

$$ED3=0.942$$





