# MANUFACTURED SOLUTION : >  $Vr := x \rightarrow \operatorname{sqrt}\left(\frac{2 \cdot varK}{Nmod}\right) \cdot sum(\cos(\operatorname{phi}[j] + (K[j, 1] \cdot x + K[j, 2]) \cdot (2 \cdot \operatorname{pi})), j = 1 ..Nmod);$  $Vr := x \mapsto \sqrt{\frac{2 \operatorname{var}K}{\operatorname{Nmod}}} \left( \sum_{i=1}^{\operatorname{Nmod}} \cos(\phi_i + 2 (K_{j,1} x + K_{j,2}) \pi) \right)$ **(1)** >  $K := x \to KMean \cdot \exp\left(-\frac{varK}{2}\right) \cdot \exp(Vr(x));$  $K := x \mapsto KMean e^{-\frac{varK}{2}} e^{Vr(x)}$ **(2)**  $KMean \ \mathbf{e}^{-\frac{varK}{2}} \ \mathbf{e}^{\sqrt{2} \sqrt{\frac{varK}{Nmod}}} \left[ \sum_{j=1}^{Nmod} \cos\left(\phi_{j} + 2\left(K_{j,\ 1}x + K_{j,\ 2}\right)\pi\right) \right]$ **(3) (4)**  $eq := diff(K(x) \cdot diff(u(x), x), x);$   $eq := KMean e^{-\frac{varK}{2}} \sqrt{2} \sqrt{\frac{varK}{Nmod}} \left( \sum_{j=1}^{Nmod} -2 K_{j,1} \pi \sin(\phi_j + 2 (K_{j,1} x)) \right)$ **(5)**  $+K_{j,2})\pi\right) e^{\sqrt{2}\sqrt{\frac{varK}{Nmod}}\left[\sum_{j=1}^{Nmod}\cos\left(\phi_{j}+2\left(K_{j,1}x+K_{j,2}\right)\pi\right)\right]}\cos(x)$  $-KMean e^{-\frac{varK}{2}} e^{-\frac{varK}{Nmod}} \left[ \sum_{j=1}^{Nmod} \cos(\phi_j + 2(K_{j,1}x + K_{j,2})\pi) \right]$  $-\left(2\left(\sum_{j=1}^{Nmoa} K_{j,1} \sin((2K_{j,1}x + 2K_{j,2})\pi + \phi_j)\right) \cos(x) \sqrt{2} \sqrt{\frac{varK}{Nmod}}\pi\right)$ **(6)**  $+\sin(x)\left(\frac{\sqrt{2\pi K}}{2}\right) + \sqrt{2}\sqrt{\frac{\sqrt{2\pi K}}{Nmod}}\left(\sum_{j=1}^{Nmod}\cos\left(\left(\frac{2K}{j,1}x + 2K}{j,2}\right)\pi + \phi_j\right)\right)$ **(7)** > f(x)KMean e  $-\frac{varK}{2}\sqrt{2}\sqrt{\frac{varK}{Nmod}}\left(\sum_{j=1}^{Nmod}-2K_{j,1}\pi\sin(\phi_j+2(K_{j,1}x))\right)$ **(8)**  $+K_{j,2}$ )  $\pi$ )  $\left( e^{\sqrt{2} \sqrt{\frac{varK}{Nmod}}} \left( \sum_{j=1}^{Nmod} \cos(\phi_j + 2(K_{j,1}x + K_{j,2})\pi) \right) \cos(x) \right)$ 

$$\begin{bmatrix} -\frac{varK}{2} & \sqrt{2} \sqrt{\frac{varK}{Nmod}} \left( \sum_{j=1}^{Nmod} \cos(\phi_{j} + 2 \binom{K}{j, 1} x + K_{j, 2}) \pi \right) \\ + BOUNDARY CONDITIONS : \end{bmatrix} \sin(x)$$

$$\begin{bmatrix} > U(a) = 3 + \sin(a); & U(a) = 3 + \sin(a) \\ > U(b) = 3 + \sin(b); & U(b) = 3 + \sin(b) \end{bmatrix}$$

$$\begin{vmatrix} > U(b) = 3 + \sin(b) \\ > diff(K(x), x) \\ KMean e^{-\frac{varK}{2}} \sqrt{2} \sqrt{\frac{varK}{Nmod}} \left( \sum_{j=1}^{Nmod} -2 K_{j, 1} \pi \sin(\phi_{j} + 2 (K_{j, 1} x) + K_{j, 2}) \pi \right) \right)$$

$$\begin{vmatrix} + K_{j, 2} \end{pmatrix} \pi$$

$$\begin{vmatrix} \sqrt{2} \sqrt{\frac{varK}{Nmod}} \binom{Nmod}{\sum_{j=1}^{Nmod}} \cos(\phi_{j} + 2 \binom{K_{j, 1}}{k_{j, 2}} x + K_{j, 2}) \pi \right)$$

$$\begin{vmatrix} - K_{j, 2} \end{pmatrix} \pi$$

$$\begin{vmatrix} - K_{j, 2} \end{pmatrix} \pi$$

$$\begin{vmatrix} - K_{j, 2} \end{pmatrix} e^{-\frac{varK}{Nmod}} \sqrt{\frac{varK}{Nmod}} \binom{Nmod}{\sum_{j=1}^{Nmod}} \cos(\phi_{j} + 2 \binom{K_{j, 1}}{k_{j, 2}} x + K_{j, 2}) \pi$$