num211
input:

$$n = 2, s = 3$$
$$(\Rightarrow sn = 6)$$

$$M = \begin{pmatrix} 1 & 4 \\ 3 & 0 \end{pmatrix} \in \mathbb{R}^{n \times n}$$
$$g := t \mapsto e^{-2t} \begin{pmatrix} 4 \\ 3 \end{pmatrix} \in \mathbb{R}^n$$
$$f := (t, x) \mapsto M \cdot x + g(t) \in \mathbb{R}^n$$
$$x_0 := \begin{pmatrix} 3 \\ 5 \end{pmatrix} \in \mathbb{R}^n$$
$$A := \begin{pmatrix} 0 & 0 & 0 \\ 1/4 & 1/4 & 0 \\ 0 & 1 & 0 \end{pmatrix} \in \mathbb{R}^{s \times s}$$
$$b := \begin{pmatrix} 1/6 \\ 2/3 \\ 1/6 \end{pmatrix} \in \mathbb{R}^s$$
$$c := \begin{pmatrix} 0 \\ 1/2 \\ 1 \end{pmatrix} \in \mathbb{R}^s$$
$$h := 0.00001$$

(The code should also work for other numbers, this is just an example).
I want that the following system of equations gets solved (you can use the built in function for the identity matrix and the Kronecker-product from the LinearAlgebra package):

$$X = X_0 + h \cdot \Big(\mathrm{KroneckerProduct(A, IdentityMatrix(n))} \cdot F(T, X)\Big)$$

where

$$X := \begin{pmatrix} x_1 \\ \vdots \\ x_s \end{pmatrix} \in \mathbb{R}^{sn} \text{ (Each } \mathrm{x_i} \text{ has dimension n and we have s of such } \mathrm{x_i}, \text{meaning } \mathrm{x_1} = (\mathrm{x_{1,1}}, \ldots, \mathrm{x_{1,n}}))$$
$$X_0 := \begin{pmatrix} x_0 \\ \vdots \\ x_0 \end{pmatrix} \in \mathbb{R}^{sn} \text{ (s entries of the vector } \mathrm{x_0})$$
$$F(T, X) := \begin{pmatrix} f(hc_1, x_1) \\ \vdots \\ f(hc_s, x_s) \end{pmatrix} \in \mathbb{R}^{sn} \text{(f maps into } \mathrm{R^n} \text{ and we have s entries)}$$

So maple should solve the above system for the vectors $x_1, \ldots, x_s$ (each of them is in $\mathbb{R}^n$) and then evaluate
output:

$$x_0 + h(b_1 f(c_1 h, x_1) + \ldots + b_s f(c_s h, x_s))$$

I am not 100% sure whether I did any mistakes but I ended up with the solution

$$\begin{pmatrix} 2.99899255509596 \\ 4.99919047401420 \end{pmatrix}$$

for the above example, if you want something to compare. But I was not able to code the above steps as a procedure, I did it step by step.