Explanation for the MATLAB scripts in Check_for_stability

The MATLAB scripts in this repository were provided by Yoshio Komori (komori@phys.kyutech.ac.jp) to give numerical results in a manuscript, "Formulae for mixed moments of Wiener processes and a stochastic area integral". Anyone is allowed to use, copy, modify and test them for non-commercial purposes without fee. The scripts are provided for use as is without warranty of any kind.

The scripts can solve the following noncommutative test SDE:

$$\mathrm{d}\boldsymbol{y}(t) = F_0\boldsymbol{y}(t)\mathrm{d}t + F_1\boldsymbol{y}(t)\mathrm{d}W_1(t) + F_2\boldsymbol{y}(t)\mathrm{d}W_2(t), \quad \boldsymbol{y}(0) = \boldsymbol{y}_0,$$

where

$$F_0 = \begin{bmatrix} \lambda & 0 \\ 0 & \lambda \end{bmatrix}, \qquad F_1 = \begin{bmatrix} \sigma_1 & 0 \\ 0 & -\sigma_1 \end{bmatrix}, \qquad F_2 = \begin{bmatrix} 0 & \sigma_2 \\ \sigma_2 & 0 \end{bmatrix}$$

for nonzero real numbers λ, σ_1 and σ_2.

The script "main_simul_by_MagMilstein.m" gives approximate solutions $(\boldsymbol{y}_n)$ in files by the Magnus-type Milstein method. It might take time to get them. For convenience sake, they are given in this directory. By reading the files, the script "output_example_for_stab.m" gives the arithmetic mean and standard deviation of $\|\boldsymbol{y}_n\|^2$.

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