

Assignment 4

Error vs iteration

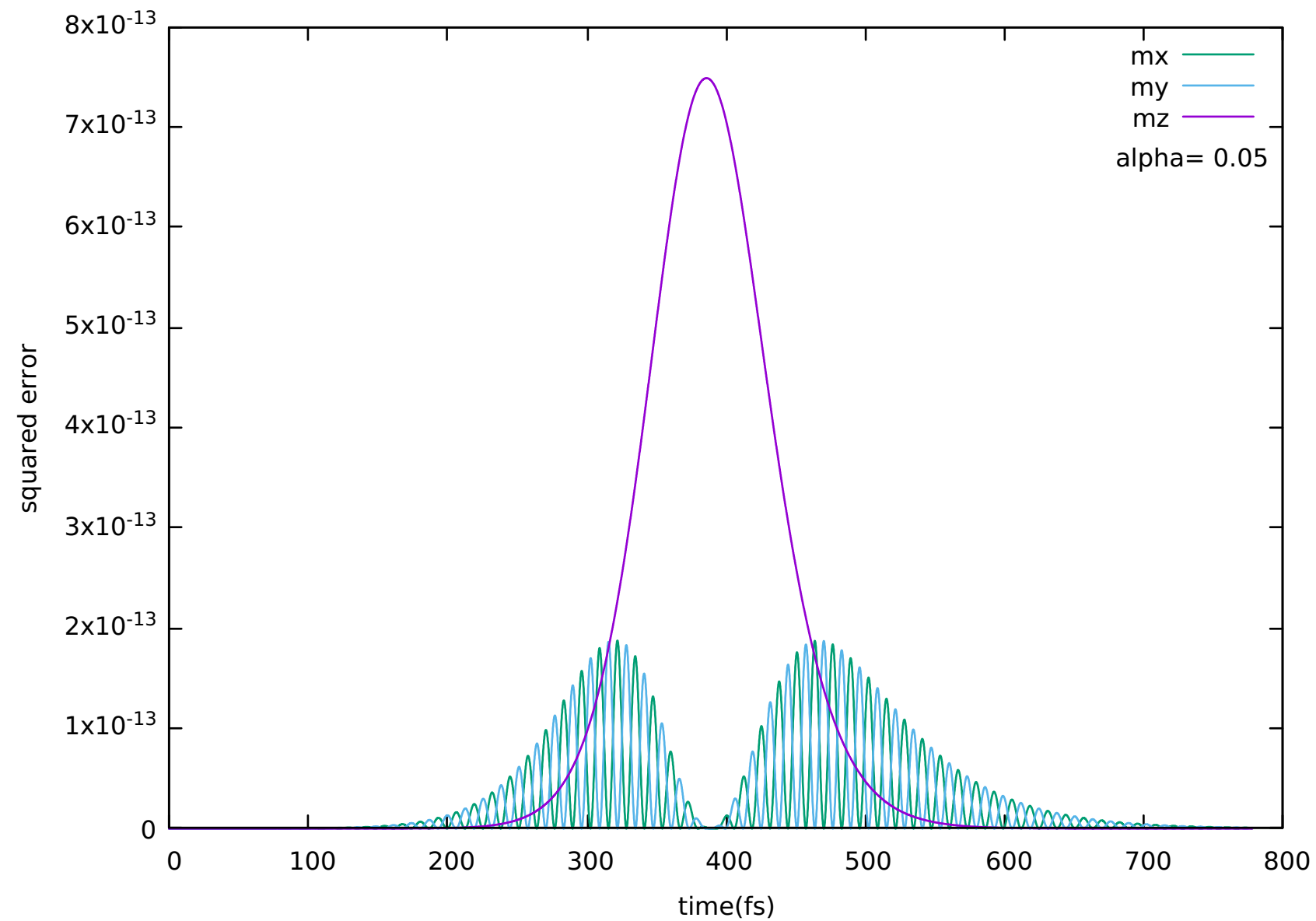
METHODS USED TO SOLVE ODE :

1. MIDPOINT METHOD
2. 4TH ORDER RUNGE-KUTTA

step size : $1e-16$ seconds
alpha : 0.05

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Error vs time



RMS Error vs step-size

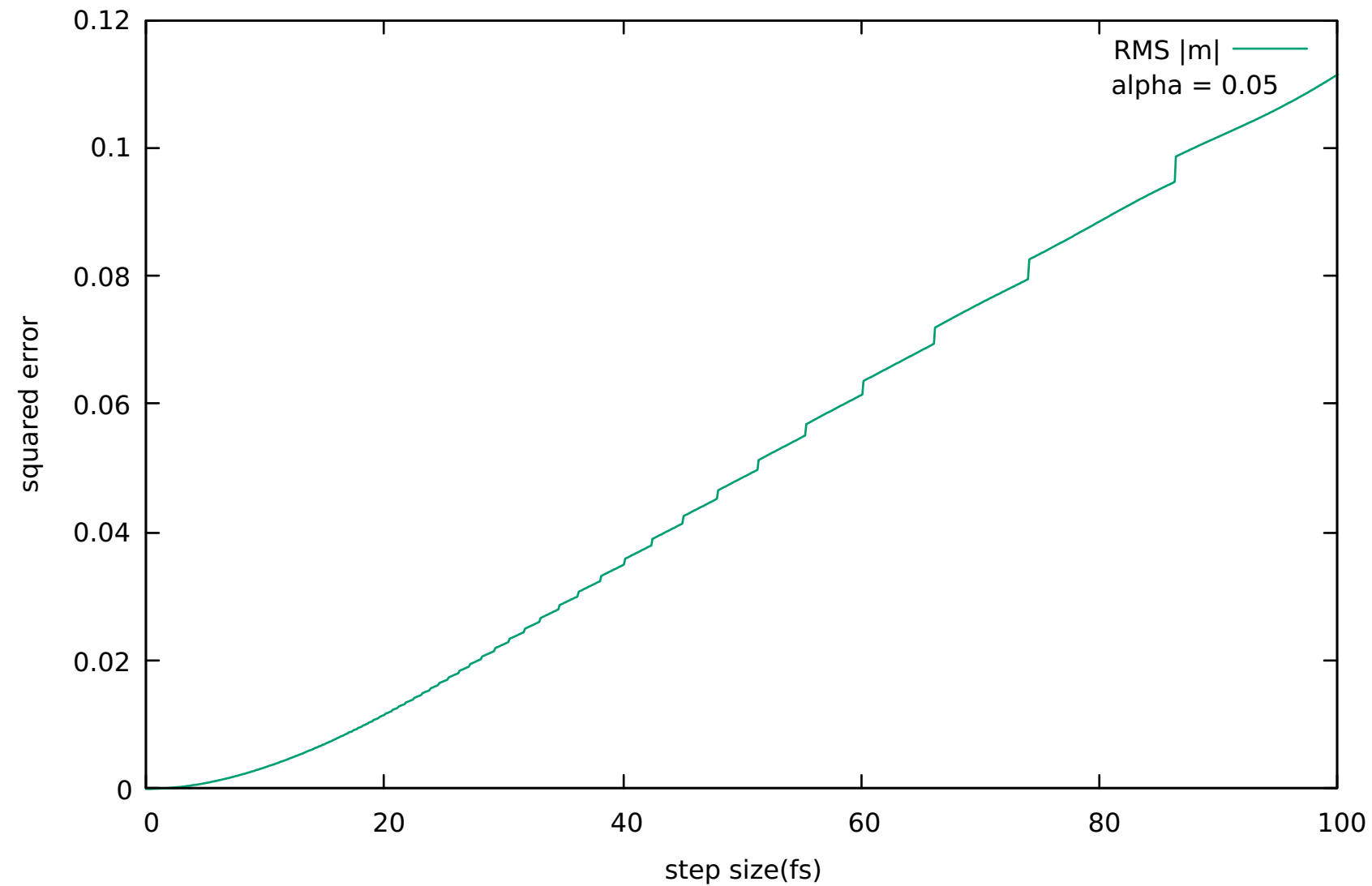
METHODS USED TO SOLVE ODE :

1. MIDPOINT METHOD
2. 4TH ORDER RUNGE-KUTTA

alpha : 0.05

RMS Error vs Stepsize

4



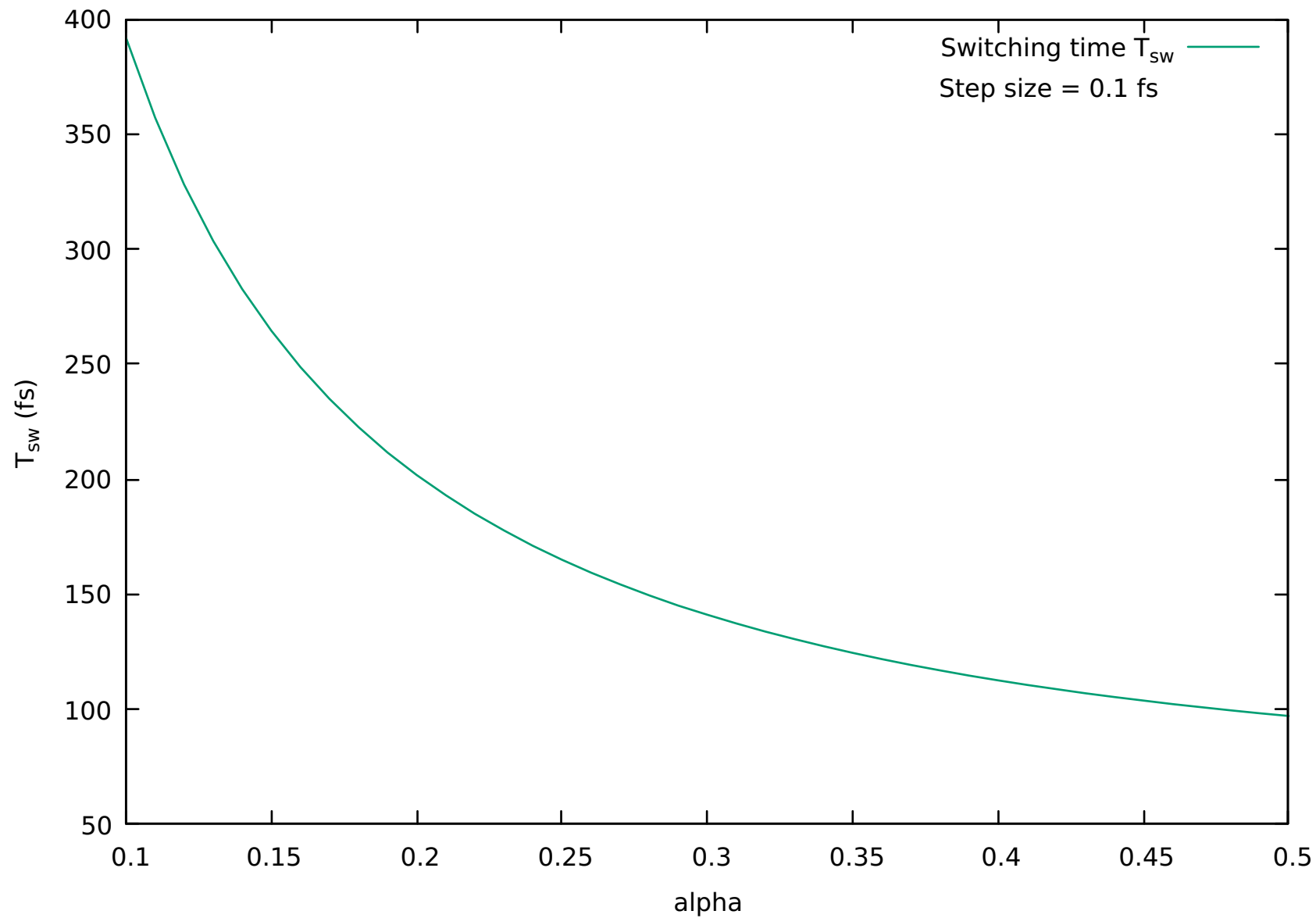
Switching time vs alpha

METHOD USED TO SOLVE ODE :
MIDPOINT METHOD

step size : $1e-19$ seconds

Observation :

The time taken for the switch to flip to other side
i.e the switching time T_{sw} decreases
exponentially with increase in alpha

T_{sw} vs alpha

Normalized vector $\langle m \rangle$

METHOD USED TO SOLVE ODE :
MIDPOINT METHOD

step size : $1e-15$ seconds

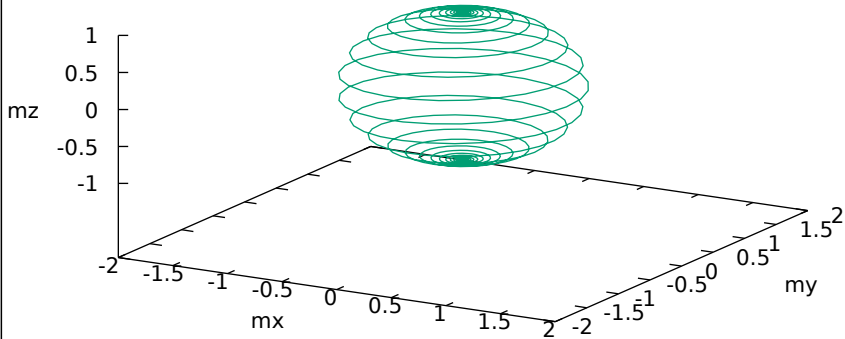
GRAPH PLOTS INCLUDE :

1. PATH OF TIP OF UNIT $\langle M \rangle$ VECTOR
FOR DIFFERENT VALUES OF ALPHA
2. COMPONENTS OF UNIT $\langle M \rangle$
VECTOR FOR DIFFERENT ALPHA

Locus of $\langle m \rangle$ $\alpha = 0.05$

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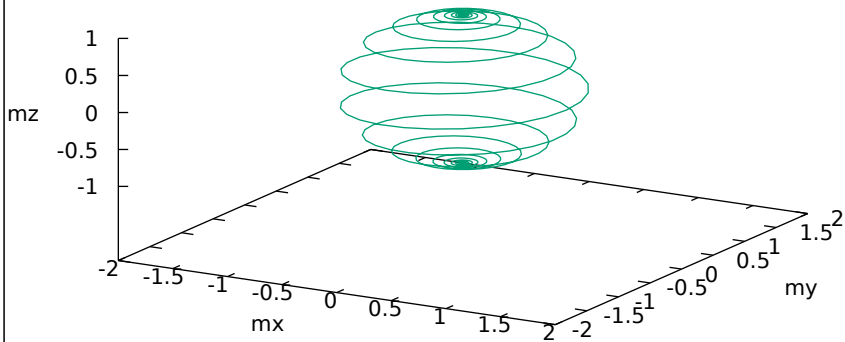
$\langle m \rangle$ —



Locus of $\langle m \rangle$ $\alpha = 0.075$

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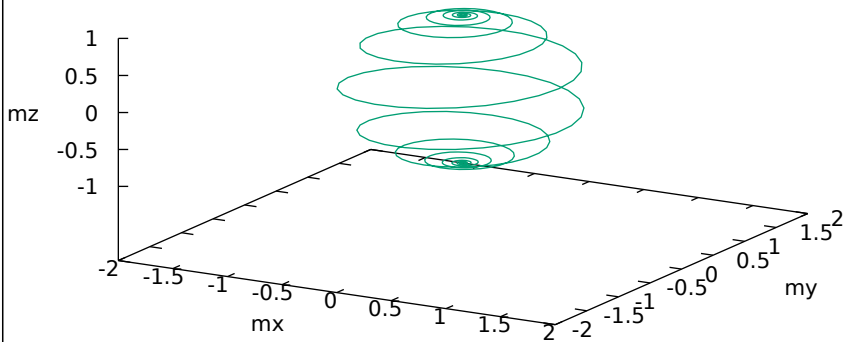
$\langle m \rangle$ —



Locus of $\langle m \rangle$ $\alpha = 0.1$

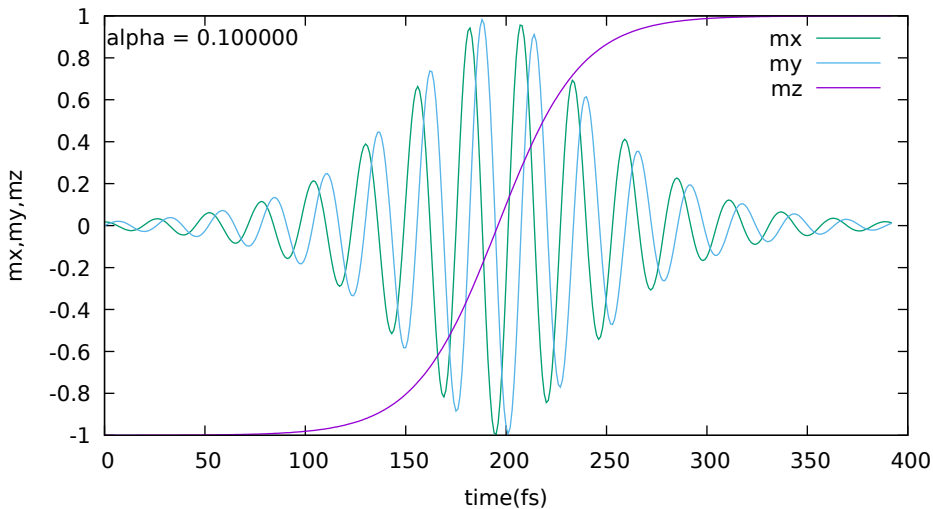
10

$\langle m \rangle$ —



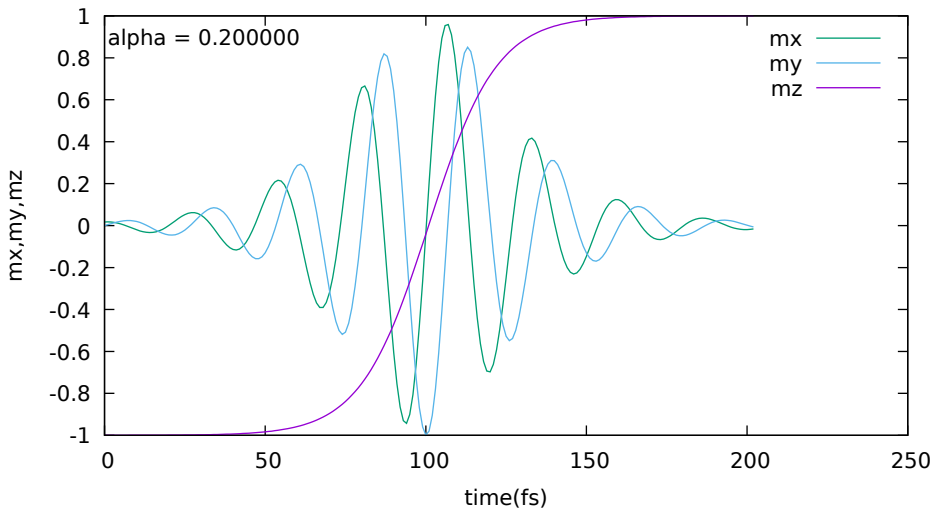
mx,my,mz vs time

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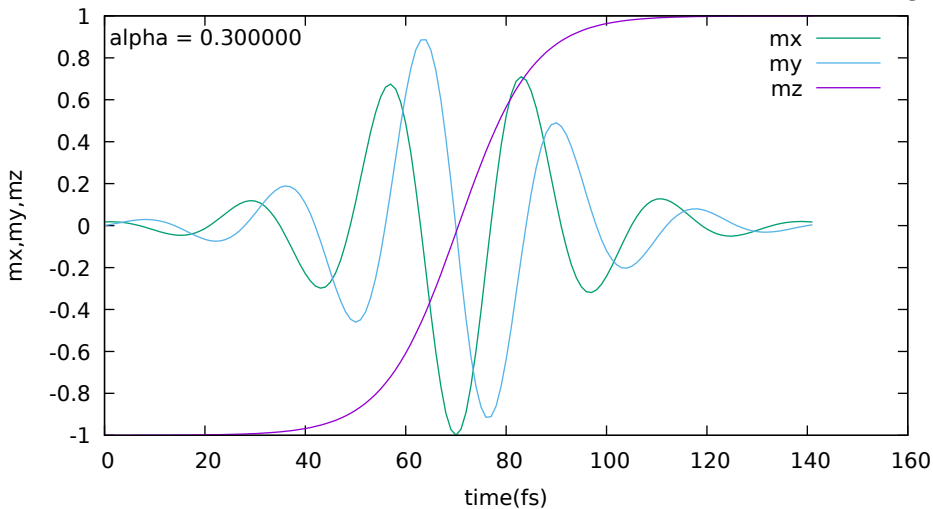
mx,my,mz vs time

12



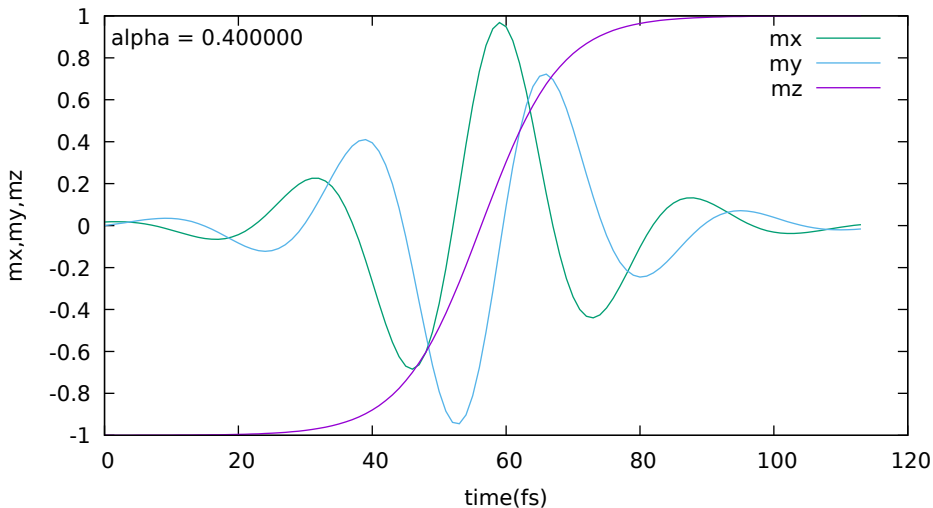
mx,my,mz vs time

13



mx,my,mz vs time

14



mx,my,mz vs time

15

