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**Chemical engineering**

**16/eng01/019**

**ENG 381 assignment 3**

**1.** commandwindow

clear

clc

close all

syms y(t)

tn=[0:0.1:50]

v= diff(y,t,2)+5\*diff(y,t,1)+6\*y==cos(t)

dy=diff(y,t)

vcond=[y(0)==5,dy(0)==3]

z=dsolve(v,vcond)

j=subs(z,tn)

plot(tn,j)

xlabel('time(min)')

ylabel('vibrations')

grid on

grid minor

axis tight

Answer:

tn =

 Columns 1 through 12

 0 0.1000 0.2000 0.3000 0.4000 0.5000 0.6000 0.7000 0.8000 0.9000 1.0000 1.1000

 Columns 13 through 24

 1.2000 1.3000 1.4000 1.5000 1.6000 1.7000 1.8000 1.9000 2.0000 2.1000 2.2000 2.3000

 Columns 25 through 36

 2.4000 2.5000 2.6000 2.7000 2.8000 2.9000 3.0000 3.1000 3.2000 3.3000 3.4000 3.5000

 Columns 37 through 48

 3.6000 3.7000 3.8000 3.9000 4.0000 4.1000 4.2000 4.3000 4.4000 4.5000 4.6000 4.7000

 Columns 49 through 60

 4.8000 4.9000 5.0000 5.1000 5.2000 5.3000 5.4000 5.5000 5.6000 5.7000 5.8000 5.9000

 Columns 61 through 72

 6.0000 6.1000 6.2000 6.3000 6.4000 6.5000 6.6000 6.7000 6.8000 6.9000 7.0000 7.1000

 Columns 73 through 84

 7.2000 7.3000 7.4000 7.5000 7.6000 7.7000 7.8000 7.9000 8.0000 8.1000 8.2000 8.3000

 Columns 85 through 96

 8.4000 8.5000 8.6000 8.7000 8.8000 8.9000 9.0000 9.1000 9.2000 9.3000 9.4000 9.5000

 Columns 97 through 108

 9.6000 9.7000 9.8000 9.9000 10.0000 10.1000 10.2000 10.3000 10.4000 10.5000 10.6000 10.7000

 Columns 109 through 120

 10.8000 10.9000 11.0000 11.1000 11.2000 11.3000 11.4000 11.5000 11.6000 11.7000 11.8000 11.9000

 Columns 121 through 132

 12.0000 12.1000 12.2000 12.3000 12.4000 12.5000 12.6000 12.7000 12.8000 12.9000 13.0000 13.1000

 Columns 133 through 144

 13.2000 13.3000 13.4000 13.5000 13.6000 13.7000 13.8000 13.9000 14.0000 14.1000 14.2000 14.3000

 Columns 145 through 156

 14.4000 14.5000 14.6000 14.7000 14.8000 14.9000 15.0000 15.1000 15.2000 15.3000 15.4000 15.5000

 Columns 157 through 168

 15.6000 15.7000 15.8000 15.9000 16.0000 16.1000 16.2000 16.3000 16.4000 16.5000 16.6000 16.7000

 Columns 169 through 180

 16.8000 16.9000 17.0000 17.1000 17.2000 17.3000 17.4000 17.5000 17.6000 17.7000 17.8000 17.9000

 Columns 181 through 192

 18.0000 18.1000 18.2000 18.3000 18.4000 18.5000 18.6000 18.7000 18.8000 18.9000 19.0000 19.1000

 Columns 193 through 204

 19.2000 19.3000 19.4000 19.5000 19.6000 19.7000 19.8000 19.9000 20.0000 20.1000 20.2000 20.3000

 Columns 205 through 216

 20.4000 20.5000 20.6000 20.7000 20.8000 20.9000 21.0000 21.1000 21.2000 21.3000 21.4000 21.5000

 Columns 217 through 228

 21.6000 21.7000 21.8000 21.9000 22.0000 22.1000 22.2000 22.3000 22.4000 22.5000 22.6000 22.7000

 Columns 229 through 240

 22.8000 22.9000 23.0000 23.1000 23.2000 23.3000 23.4000 23.5000 23.6000 23.7000 23.8000 23.9000

 Columns 241 through 252

 24.0000 24.1000 24.2000 24.3000 24.4000 24.5000 24.6000 24.7000 24.8000 24.9000 25.0000 25.1000

 Columns 253 through 264

 25.2000 25.3000 25.4000 25.5000 25.6000 25.7000 25.8000 25.9000 26.0000 26.1000 26.2000 26.3000

 Columns 265 through 276

 26.4000 26.5000 26.6000 26.7000 26.8000 26.9000 27.0000 27.1000 27.2000 27.3000 27.4000 27.5000

 Columns 277 through 288

 27.6000 27.7000 27.8000 27.9000 28.0000 28.1000 28.2000 28.3000 28.4000 28.5000 28.6000 28.7000

 Columns 289 through 300

 28.8000 28.9000 29.0000 29.1000 29.2000 29.3000 29.4000 29.5000 29.6000 29.7000 29.8000 29.9000

 Columns 301 through 312

 30.0000 30.1000 30.2000 30.3000 30.4000 30.5000 30.6000 30.7000 30.8000 30.9000 31.0000 31.1000

 Columns 313 through 324

 31.2000 31.3000 31.4000 31.5000 31.6000 31.7000 31.8000 31.9000 32.0000 32.1000 32.2000 32.3000

 Columns 325 through 336

 32.4000 32.5000 32.6000 32.7000 32.8000 32.9000 33.0000 33.1000 33.2000 33.3000 33.4000 33.5000

 Columns 337 through 348

 33.6000 33.7000 33.8000 33.9000 34.0000 34.1000 34.2000 34.3000 34.4000 34.5000 34.6000 34.7000

 Columns 349 through 360

 34.8000 34.9000 35.0000 35.1000 35.2000 35.3000 35.4000 35.5000 35.6000 35.7000 35.8000 35.9000

 Columns 361 through 372

 36.0000 36.1000 36.2000 36.3000 36.4000 36.5000 36.6000 36.7000 36.8000 36.9000 37.0000 37.1000

 Columns 373 through 384

 37.2000 37.3000 37.4000 37.5000 37.6000 37.7000 37.8000 37.9000 38.0000 38.1000 38.2000 38.3000

 Columns 385 through 396

 38.4000 38.5000 38.6000 38.7000 38.8000 38.9000 39.0000 39.1000 39.2000 39.3000 39.4000 39.5000

 Columns 397 through 408

 39.6000 39.7000 39.8000 39.9000 40.0000 40.1000 40.2000 40.3000 40.4000 40.5000 40.6000 40.7000

 Columns 409 through 420

 40.8000 40.9000 41.0000 41.1000 41.2000 41.3000 41.4000 41.5000 41.6000 41.7000 41.8000 41.9000

 Columns 421 through 432

 42.0000 42.1000 42.2000 42.3000 42.4000 42.5000 42.6000 42.7000 42.8000 42.9000 43.0000 43.1000

 Columns 433 through 444

 43.2000 43.3000 43.4000 43.5000 43.6000 43.7000 43.8000 43.9000 44.0000 44.1000 44.2000 44.3000

 Columns 445 through 456

 44.4000 44.5000 44.6000 44.7000 44.8000 44.9000 45.0000 45.1000 45.2000 45.3000 45.4000 45.5000

 Columns 457 through 468

 45.6000 45.7000 45.8000 45.9000 46.0000 46.1000 46.2000 46.3000 46.4000 46.5000 46.6000 46.7000

 Columns 469 through 480

 46.8000 46.9000 47.0000 47.1000 47.2000 47.3000 47.4000 47.5000 47.6000 47.7000 47.8000 47.9000

 Columns 481 through 492

 48.0000 48.1000 48.2000 48.3000 48.4000 48.5000 48.6000 48.7000 48.8000 48.9000 49.0000 49.1000

 Columns 493 through 501

 49.2000 49.3000 49.4000 49.5000 49.6000 49.7000 49.8000 49.9000 50.0000

v(t) =

6\*y(t) + 5\*diff(y(t), t) + diff(y(t), t, t) == cos(t)

dy(t) =

diff(y(t), t)

vcond =

[ y(0) == 5, subs(diff(y(t), t), t, 0) == 3]

z =

(88\*exp(-2\*t))/5 - (127\*exp(-3\*t))/10 + (2^(1/2)\*cos(t - pi/4))/10

 j =

[ 5, (88\*exp(-1/5))/5 - (127\*exp(-3/10))/10 + (2^(1/2)\*cos(pi/4 - 1/10))/10, (88\*exp(-2/5))/5 - (127\*exp(-3/5))/10 + (2^(1/2)\*cos(pi/4 - 1/5))/10, (88\*exp(-3/5))/5 - (127\*exp(-9/10))/10 + (2^(1/2)\*cos(pi/4 - 3/10))/10, (88\*exp(-4/5))/5 - (127\*exp(-6/5))/10 + (2^(1/2)\*cos(pi/4 - 2/5))/10, (88\*exp(-1))/5 - (127\*exp(-3/2))/10 + (2^(1/2)\*cos(pi/4 - 1/2))/10, (88\*exp(-6/5))/5 - (127\*exp(-9/5))/10 + (2^(1/2)\*cos(pi/4 - 3/5))/10, (88\*exp(-7/5))/5 - (127\*exp(-21/10))/10 + (2^(1/2)\*cos(pi/4 - 7/10))/10, (88\*exp(-8/5))/5 - (127\*exp(-12/5))/10 + (2^(1/2)\*cos(pi/4 - 4/5))/10, (88\*exp(-9/5))/5 - (127\*exp(-27/10))/10 + (2^(1/2)\*cos(pi/4 - 9/10))/10, (88\*exp(-2))/5 - (127\*exp(-3))/10 + (2^(1/2)\*cos(pi/4 - 1))/10, (88\*exp(-11/5))/5 - (127\*exp(-33/10))/10 + (2^(1/2)\*cos(pi/4 - 11/10))/10, (88\*exp(-12/5))/5 - (127\*exp(-18/5))/10 + (2^(1/2)\*cos(pi/4 - 6/5))/10, (88\*exp(-13/5))/5 - (127\*exp(-39/10))/10 + (2^(1/2)\*cos(pi/4 - 13/10))/10, (88\*exp(-14/5))/5 - (127\*exp(-21/5))/10 + (2^(1/2)\*cos(pi/4 - 7/5))/10, (88\*exp(-3))/5 - (127\*exp(-9/2))/10 + (2^(1/2)\*cos(pi/4 - 3/2))/10, (88\*exp(-16/5))/5 - (127\*exp(-24/5))/10 + (2^(1/2)\*cos(pi/4 - 8/5))/10, (88\*exp(-17/5))/5 - (127\*exp(-51/10))/10 + (2^(1/2)\*cos(pi/4 - 17/10))/10, (88\*exp(-18/5))/5 - (127\*exp(-27/5))/10 + (2^(1/2)\*cos(pi/4 - 9/5))/10, (88\*exp(-19/5))/5 - (127\*exp(-57/10))/10 + (2^(1/2)\*cos(pi/4 - 19/10))/10, (88\*exp(-4))/5 - (127\*exp(-6))/10 + (2^(1/2)\*cos(pi/4 - 2))/10, (88\*exp(-21/5))/5 - (127\*exp(-63/10))/10 + (2^(1/2)\*cos(pi/4 - 21/10))/10, (88\*exp(-22/5))/5 - (127\*exp(-33/5))/10 + (2^(1/2)\*cos(pi/4 - 11/5))/10, (88\*exp(-23/5))/5 - (127\*exp(-69/10))/10 + (2^(1/2)\*cos(pi/4 - 23/10))/10, (88\*exp(-24/5))/5 - (127\*exp(-36/5))/10 + (2^(1/2)\*cos(pi/4 - 12/5))/10, (88\*exp(-5))/5 - (127\*exp(-15/2))/10 + (2^(1/2)\*cos(pi/4 - 5/2))/10, (88\*exp(-26/5))/5 - (127\*exp(-39/5))/10 + (2^(1/2)\*cos(pi/4 - 13/5))/10, (88\*exp(-27/5))/5 - (127\*exp(-81/10))/10 + (2^(1/2)\*cos(pi/4 - 27/10))/10, (88\*exp(-28/5))/5 - (127\*exp(-42/5))/10 + (2^(1/2)\*cos(pi/4 - 14/5))/10, (88\*exp(-29/5))/5 - (127\*exp(-87/10))/10 + (2^(1/2)\*cos(pi/4 - 29/10))/10, (88\*exp(-6))/5 - (127\*exp(-9))/10 + (2^(1/2)\*cos(pi/4 - 3))/10, (88\*exp(-31/5))/5 - (127\*exp(-93/10))/10 + (2^(1/2)\*cos(pi/4 - 31/10))/10, (88\*exp(-32/5))/5 - (127\*exp(-48/5))/10 + (2^(1/2)\*cos(pi/4 - 16/5))/10, (88\*exp(-33/5))/5 - (127\*exp(-99/10))/10 + (2^(1/2)\*cos(pi/4 - 33/10))/10, (88\*exp(-34/5))/5 - (127\*exp(-51/5))/10 + (2^(1/2)\*cos(pi/4 - 17/5))/10, (88\*exp(-7))/5 - (127\*exp(-21/2))/10 + (2^(1/2)\*cos(pi/4 - 7/2))/10, (88\*exp(-36/5))/5 - (127\*exp(-54/5))/10 + (2^(1/2)\*cos(pi/4 - 18/5))/10, (88\*exp(-37/5))/5 - (127\*exp(-111/10))/10 + (2^(1/2)\*cos(pi/4 - 37/10))/10, (88\*exp(-38/5))/5 - (127\*exp(-57/5))/10 + (2^(1/2)\*cos(pi/4 - 19/5))/10, (88\*exp(-39/5))/5 - (127\*exp(-117/10))/10 + (2^(1/2)\*cos(pi/4 - 39/10))/10, (88\*exp(-8))/5 - (127\*exp(-12))/10 + (2^(1/2)\*cos(pi/4 - 4))/10, (88\*exp(-41/5))/5 - (127\*exp(-123/10))/10 + (2^(1/2)\*cos(pi/4 - 41/10))/10, (88\*exp(-42/5))/5 - (127\*exp(-63/5))/10 + (2^(1/2)\*cos(pi/4 - 21/5))/10, (88\*exp(-43/5))/5 - (127\*exp(-129/10))/10 + (2^(1/2)\*cos(pi/4 - 43/10))/10, (88\*exp(-44/5))/5 - (127\*exp(-66/5))/10 + (2^(1/2)\*cos(pi/4 - 22/5))/10, (88\*exp(-9))/5 - (127\*exp(-27/2))/10 + (2^(1/2)\*cos(pi/4 - 9/2))/10, (88\*exp(-46/5))/5 - (127\*exp(-69/5))/10 + (2^(1/2)\*cos(pi/4 - 23/5))/10, (88\*exp(-47/5))/5 - (127\*exp(-141/10))/10 + (2^(1/2)\*cos(pi/4 - 47/10))/10, (88\*exp(-48/5))/5 - (127\*exp(-72/5))/10 + (2^(1/2)\*cos(pi/4 - 24/5))/10, (88\*exp(-49/5))/5 - (127\*exp(-147/10))/10 + (2^(1/2)\*cos(pi/4 - 49/10))/10, (88\*exp(-10))/5 - (127\*exp(-15))/10 + (2^(1/2)\*cos(pi/4 - 5))/10, (88\*exp(-51/5))/5 - (127\*exp(-153/10))/10 + (2^(1/2)\*cos(pi/4 - 51/10))/10, (88\*exp(-52/5))/5 - (127\*exp(-78/5))/10 + (2^(1/2)\*cos(pi/4 - 26/5))/10, (88\*exp(-53/5))/5 - (127\*exp(-159/10))/10 + (2^(1/2)\*cos(pi/4 - 53/10))/10, (88\*exp(-54/5))/5 - (127\*exp(-81/5))/10 + (2^(1/2)\*cos(pi/4 - 27/5))/10, (88\*exp(-11))/5 - (127\*exp(-33/2))/10 + (2^(1/2)\*cos(pi/4 - 11/2))/10, (88\*exp(-56/5))/5 - (127\*exp(-84/5))/10 + (2^(1/2)\*cos(pi/4 - 28/5))/10, (88\*exp(-57/5))/5 - (127\*exp(-171/10))/10 + (2^(1/2)\*cos(pi/4 - 57/10))/10, (88\*exp(-58/5))/5 - (127\*exp(-87/5))/10 + (2^(1/2)\*cos(pi/4 - 29/5))/10, (88\*exp(-59/5))/5 - (127\*exp(-177/10))/10 + (2^(1/2)\*cos(pi/4 - 59/10))/10, (88\*exp(-12))/5 - (127\*exp(-18))/10 + (2^(1/2)\*cos(pi/4 - 6))/10, (88\*exp(-61/5))/5 - (127\*exp(-183/10))/10 + (2^(1/2)\*cos(pi/4 - 61/10))/10, (88\*exp(-62/5))/5 - (127\*exp(-93/5))/10 + (2^(1/2)\*cos(pi/4 - 31/5))/10, (88\*exp(-63/5))/5 - (127\*exp(-189/10))/10 + (2^(1/2)\*cos(pi/4 - 63/10))/10, (88\*exp(-64/5))/5 - (127\*exp(-96/5))/10 + (2^(1/2)\*cos(pi/4 - 32/5))/10, (88\*exp(-13))/5 - (127\*exp(-39/2))/10 + (2^(1/2)\*cos(pi/4 - 13/2))/10, (88\*exp(-66/5))/5 - (127\*exp(-99/5))/10 + (2^(1/2)\*cos(pi/4 - 33/5))/10, (88\*exp(-67/5))/5 - (127\*exp(-201/10))/10 + (2^(1/2)\*cos(pi/4 - 67/10))/10, (88\*exp(-68/5))/5 - (127\*exp(-102/5))/10 + (2^(1/2)\*cos(pi/4 - 34/5))/10, (88\*exp(-69/5))/5 - (127\*exp(-207/10))/10 + (2^(1/2)\*cos(pi/4 - 69/10))/10, (88\*exp(-14))/5 - (127\*exp(-21))/10 + (2^(1/2)\*cos(pi/4 - 7))/10, (88\*exp(-71/5))/5 - (127\*exp(-213/10))/10 + (2^(1/2)\*cos(pi/4 - 71/10))/10, (88\*exp(-72/5))/5 - (127\*exp(-108/5))/10 + (2^(1/2)\*cos(pi/4 - 36/5))/10, (88\*exp(-73/5))/5 - (127\*exp(-219/10))/10 + (2^(1/2)\*cos(pi/4 - 73/10))/10, (88\*exp(-74/5))/5 - (127\*exp(-111/5))/10 + (2^(1/2)\*cos(pi/4 - 37/5))/10, (88\*exp(-15))/5 - (127\*exp(-45/2))/10 + (2^(1/2)\*cos(pi/4 - 15/2))/10, (88\*exp(-76/5))/5 - (127\*exp(-114/5))/10 + (2^(1/2)\*cos(pi/4 - 38/5))/10, (88\*exp(-77/5))/5 - (127\*exp(-231/10))/10 + (2^(1/2)\*cos(pi/4 - 77/10))/10, (88\*exp(-78/5))/5 - (127\*exp(-117/5))/10 + (2^(1/2)\*cos(pi/4 - 39/5))/10, (88\*exp(-79/5))/5 - (127\*exp(-237/10))/10 + (2^(1/2)\*cos(pi/4 - 79/10))/10, (88\*exp(-16))/5 - (127\*exp(-24))/10 + (2^(1/2)\*cos(pi/4 - 8))/10, (88\*exp(-81/5))/5 - (127\*exp(-243/10))/10 + (2^(1/2)\*cos(pi/4 - 81/10))/10, (88\*exp(-82/5))/5 - (127\*exp(-123/5))/10 + (2^(1/2)\*cos(pi/4 - 41/5))/10, (88\*exp(-83/5))/5 - (127\*exp(-249/10))/10 + (2^(1/2)\*cos(pi/4 - 83/10))/10, (88\*exp(-84/5))/5 - (127\*exp(-126/5))/10 + (2^(1/2)\*cos(pi/4 - 42/5))/10, (88\*exp(-17))/5 - (127\*exp(-51/2))/10 + (2^(1/2)\*cos(pi/4 - 17/2))/10, (88\*exp(-86/5))/5 - (127\*exp(-129/5))/10 + (2^(1/2)\*cos(pi/4 - 43/5))/10, (88\*exp(-87/5))/5 - (127\*exp(-261/10))/10 + (2^(1/2)\*cos(pi/4 - 87/10))/10, (88\*exp(-88/5))/5 - (127\*exp(-132/5))/10 + (2^(1/2)\*cos(pi/4 - 44/5))/10, (88\*exp(-89/5))/5 - (127\*exp(-267/10))/10 + (2^(1/2)\*cos(pi/4 - 89/10))/10, (88\*exp(-18))/5 - (127\*exp(-27))/10 + (2^(1/2)\*cos(pi/4 - 9))/10, (88\*exp(-91/5))/5 - (127\*exp(-273/10))/10 + (2^(1/2)\*cos(pi/4 - 91/10))/10, (88\*exp(-92/5))/5 - (127\*exp(-138/5))/10 + (2^(1/2)\*cos(pi/4 - 46/5))/10, (88\*exp(-93/5))/5 - (127\*exp(-279/10))/10 + (2^(1/2)\*cos(pi/4 - 93/10))/10, (88\*exp(-94/5))/5 - (127\*exp(-141/5))/10 + (2^(1/2)\*cos(pi/4 - 47/5))/10, (88\*exp(-19))/5 - (127\*exp(-57/2))/10 + (2^(1/2)\*cos(pi/4 - 19/2))/10, (88\*exp(-96/5))/5 - (127\*exp(-144/5))/10 + (2^(1/2)\*cos(pi/4 - 48/5))/10, (88\*exp(-97/5))/5 - (127\*exp(-291/10))/10 + (2^(1/2)\*cos(pi/4 - 97/10))/10, (88\*exp(-98/5))/5 - (127\*exp(-147/5))/10 + (2^(1/2)\*cos(pi/4 - 49/5))/10, (88\*exp(-99/5))/5 - (127\*exp(-297/10))/10 + (2^(1/2)\*cos(pi/4 - 99/10))/10, (88\*exp(-20))/5 - (127\*exp(-30))/10 + (2^(1/2)\*cos(pi/4 - 10))/10, (88\*exp(-101/5))/5 - (127\*exp(-303/10))/10 + (2^(1/2)\*cos(pi/4 - 101/10))/10, (88\*exp(-102/5))/5 - (127\*exp(-153/5))/10 + (2^(1/2)\*cos(pi/4 - 51/5))/10, (88\*exp(-103/5))/5 - (127\*exp(-309/10))/10 + (2^(1/2)\*cos(pi/4 - 103/10))/10, (88\*exp(-104/5))/5 - (127\*exp(-156/5))/10 + (2^(1/2)\*cos(pi/4 - 52/5))/10, (88\*exp(-21))/5 - (127\*exp(-63/2))/10 + (2^(1/2)\*cos(pi/4 - 21/2))/10, (88\*exp(-106/5))/5 - (127\*exp(-159/5))/10 + (2^(1/2)\*cos(pi/4 - 53/5))/10, (88\*exp(-107/5))/5 - (127\*exp(-321/10))/10 + (2^(1/2)\*cos(pi/4 - 107/10))/10, (88\*exp(-108/5))/5 - (127\*exp(-162/5))/10 + (2^(1/2)\*cos(pi/4 - 54/5))/10, (88\*exp(-109/5))/5 - (127\*exp(-327/10))/10 + (2^(1/2)\*cos(pi/4 - 109/10))/10, (88\*exp(-22))/5 - (127\*exp(-33))/10 + (2^(1/2)\*cos(pi/4 - 11))/10, (88\*exp(-111/5))/5 - (127\*exp(-333/10))/10 + (2^(1/2)\*cos(pi/4 - 111/10))/10, (88\*exp(-112/5))/5 - (127\*exp(-168/5))/10 + (2^(1/2)\*cos(pi/4 - 56/5))/10, (88\*exp(-113/5))/5 - (127\*exp(-339/10))/10 + (2^(1/2)\*cos(pi/4 - 113/10))/10, (88\*exp(-114/5))/5 - (127\*exp(-171/5))/10 + (2^(1/2)\*cos(pi/4 - 57/5))/10, (88\*exp(-23))/5 - (127\*exp(-69/2))/10 + (2^(1/2)\*cos(pi/4 - 23/2))/10, (88\*exp(-116/5))/5 - (127\*exp(-174/5))/10 + (2^(1/2)\*cos(pi/4 - 58/5))/10, (88\*exp(-117/5))/5 - (127\*exp(-351/10))/10 + (2^(1/2)\*cos(pi/4 - 117/10))/10, (88\*exp(-118/5))/5 - (127\*exp(-177/5))/10 + (2^(1/2)\*cos(pi/4 - 59/5))/10, (88\*exp(-119/5))/5 - (127\*exp(-357/10))/10 + (2^(1/2)\*cos(pi/4 - 119/10))/10, (88\*exp(-24))/5 - (127\*exp(-36))/10 + (2^(1/2)\*cos(pi/4 - 12))/10, (88\*exp(-121/5))/5 - (127\*exp(-363/10))/10 + (2^(1/2)\*cos(pi/4 - 121/10))/10, (88\*exp(-122/5))/5 - (127\*exp(-183/5))/10 + (2^(1/2)\*cos(pi/4 - 61/5))/10, (88\*exp(-123/5))/5 - (127\*exp(-369/10))/10 + (2^(1/2)\*cos(pi/4 - 123/10))/10, (88\*exp(-124/5))/5 - (127\*exp(-186/5))/10 + (2^(1/2)\*cos(pi/4 - 62/5))/10, (88\*exp(-25))/5 - (127\*exp(-75/2))/10 + (2^(1/2)\*cos(pi/4 - 25/2))/10, (88\*exp(-126/5))/5 - (127\*exp(-189/5))/10 + (2^(1/2)\*cos(pi/4 - 63/5))/10, (88\*exp(-127/5))/5 - (127\*exp(-381/10))/10 + (2^(1/2)\*cos(pi/4 - 127/10))/10, (88\*exp(-128/5))/5 - (127\*exp(-192/5))/10 + (2^(1/2)\*cos(pi/4 - 64/5))/10, (88\*exp(-129/5))/5 - (127\*exp(-387/10))/10 + (2^(1/2)\*cos(pi/4 - 129/10))/10, (88\*exp(-26))/5 - (127\*exp(-39))/10 + (2^(1/2)\*cos(pi/4 - 13))/10, (88\*exp(-131/5))/5 - (127\*exp(-393/10))/10 + (2^(1/2)\*cos(pi/4 - 131/10))/10, (88\*exp(-132/5))/5 - (127\*exp(-198/5))/10 + (2^(1/2)\*cos(pi/4 - 66/5))/10, (88\*exp(-133/5))/5 - (127\*exp(-399/10))/10 + (2^(1/2)\*cos(pi/4 - 133/10))/10, (88\*exp(-134/5))/5 - (127\*exp(-201/5))/10 + (2^(1/2)\*cos(pi/4 - 67/5))/10, (88\*exp(-27))/5 - (127\*exp(-81/2))/10 + (2^(1/2)\*cos(pi/4 - 27/2))/10, (88\*exp(-136/5))/5 - (127\*exp(-204/5))/10 + (2^(1/2)\*cos(pi/4 - 68/5))/10, (88\*exp(-137/5))/5 - (127\*exp(-411/10))/10 + (2^(1/2)\*cos(pi/4 - 137/10))/10, (88\*exp(-138/5))/5 - (127\*exp(-207/5))/10 + (2^(1/2)\*cos(pi/4 - 69/5))/10, (88\*exp(-139/5))/5 - (127\*exp(-417/10))/10 + (2^(1/2)\*cos(pi/4 - 139/10))/10, (88\*exp(-28))/5 - (127\*exp(-42))/10 + (2^(1/2)\*cos(pi/4 - 14))/10, (88\*exp(-141/5))/5 - (127\*exp(-423/10))/10 + (2^(1/2)\*cos(pi/4 - 141/10))/10, (88\*exp(-142/5))/5 - (127\*exp(-213/5))/10 + (2^(1/2)\*cos(pi/4 - 71/5))/10, (88\*exp(-143/5))/5 - (127\*exp(-429/10))/10 + (2^(1/2)\*cos(pi/4 - 143/10))/10, (88\*exp(-144/5))/5 - (127\*exp(-216/5))/10 + (2^(1/2)\*cos(pi/4 - 72/5))/10, (88\*exp(-29))/5 - (127\*exp(-87/2))/10 + (2^(1/2)\*cos(pi/4 - 29/2))/10, (88\*exp(-146/5))/5 - (127\*exp(-219/5))/10 + (2^(1/2)\*cos(pi/4 - 73/5))/10, (88\*exp(-147/5))/5 - (127\*exp(-441/10))/10 + (2^(1/2)\*cos(pi/4 - 147/10))/10, (88\*exp(-148/5))/5 - (127\*exp(-222/5))/10 + (2^(1/2)\*cos(pi/4 - 74/5))/10, (88\*exp(-149/5))/5 - (127\*exp(-447/10))/10 + (2^(1/2)\*cos(pi/4 - 149/10))/10, (88\*exp(-30))/5 - (127\*exp(-45))/10 + (2^(1/2)\*cos(pi/4 - 15))/10, (88\*exp(-151/5))/5 - (127\*exp(-453/10))/10 + (2^(1/2)\*cos(pi/4 - 151/10))/10, (88\*exp(-152/5))/5 - (127\*exp(-228/5))/10 + (2^(1/2)\*cos(pi/4 - 76/5))/10, (88\*exp(-153/5))/5 - (127\*exp(-459/10))/10 + (2^(1/2)\*cos(pi/4 - 153/10))/10, (88\*exp(-154/5))/5 - (127\*exp(-231/5))/10 + (2^(1/2)\*cos(pi/4 - 77/5))/10, (88\*exp(-31))/5 - (127\*exp(-93/2))/10 + (2^(1/2)\*cos(pi/4 - 31/2))/10, (88\*exp(-156/5))/5 - (127\*exp(-234/5))/10 + (2^(1/2)\*cos(pi/4 - 78/5))/10, (88\*exp(-157/5))/5 - (127\*exp(-471/10))/10 + (2^(1/2)\*cos(pi/4 - 157/10))/10, (88\*exp(-158/5))/5 - (127\*exp(-237/5))/10 + (2^(1/2)\*cos(pi/4 - 79/5))/10, (88\*exp(-159/5))/5 - (127\*exp(-477/10))/10 + (2^(1/2)\*cos(pi/4 - 159/10))/10, (88\*exp(-32))/5 - (127\*exp(-48))/10 + (2^(1/2)\*cos(pi/4 - 16))/10, (88\*exp(-161/5))/5 - (127\*exp(-483/10))/10 + (2^(1/2)\*cos(pi/4 - 161/10))/10, (88\*exp(-162/5))/5 - (127\*exp(-243/5))/10 + (2^(1/2)\*cos(pi/4 - 81/5))/10, (88\*exp(-163/5))/5 - (127\*exp(-489/10))/10 + (2^(1/2)\*cos(pi/4 - 163/10))/10, (88\*exp(-164/5))/5 - (127\*exp(-246/5))/10 + (2^(1/2)\*cos(pi/4 - 82/5))/10, (88\*exp(-33))/5 - (127\*exp(-99/2))/10 + (2^(1/2)\*cos(pi/4 - 33/2))/10, (88\*exp(-166/5))/5 - (127\*exp(-249/5))/10 + (2^(1/2)\*cos(pi/4 - 83/5))/10, (88\*exp(-167/5))/5 - (127\*exp(-501/10))/10 + (2^(1/2)\*cos(pi/4 - 167/10))/10, (88\*exp(-168/5))/5 - (127\*exp(-252/5))/10 + (2^(1/2)\*cos(pi/4 - 84/5))/10, (88\*exp(-169/5))/5 - (127\*exp(-507/10))/10 + (2^(1/2)\*cos(pi/4 - 169/10))/10, (88\*exp(-34))/5 - (127\*exp(-51))/10 + (2^(1/2)\*cos(pi/4 - 17))/10, (88\*exp(-171/5))/5 - (127\*exp(-513/10))/10 + (2^(1/2)\*cos(pi/4 - 171/10))/10, (88\*exp(-172/5))/5 - (127\*exp(-258/5))/10 + (2^(1/2)\*cos(pi/4 - 86/5))/10, (88\*exp(-173/5))/5 - (127\*exp(-519/10))/10 + (2^(1/2)\*cos(pi/4 - 173/10))/10, (88\*exp(-174/5))/5 - (127\*exp(-261/5))/10 + (2^(1/2)\*cos(pi/4 - 87/5))/10, (88\*exp(-35))/5 - (127\*exp(-105/2))/10 + (2^(1/2)\*cos(pi/4 - 35/2))/10, (88\*exp(-176/5))/5 - (127\*exp(-264/5))/10 + (2^(1/2)\*cos(pi/4 - 88/5))/10, (88\*exp(-177/5))/5 - (127\*exp(-531/10))/10 + (2^(1/2)\*cos(pi/4 - 177/10))/10, (88\*exp(-178/5))/5 - (127\*exp(-267/5))/10 + (2^(1/2)\*cos(pi/4 - 89/5))/10, (88\*exp(-179/5))/5 - (127\*exp(-537/10))/10 + (2^(1/2)\*cos(pi/4 - 179/10))/10, (88\*exp(-36))/5 - (127\*exp(-54))/10 + (2^(1/2)\*cos(pi/4 - 18))/10, (88\*exp(-181/5))/5 - (127\*exp(-543/10))/10 + (2^(1/2)\*cos(pi/4 - 181/10))/10, (88\*exp(-182/5))/5 - (127\*exp(-273/5))/10 + (2^(1/2)\*cos(pi/4 - 91/5))/10, (88\*exp(-183/5))/5 - (127\*exp(-549/10))/10 + (2^(1/2)\*cos(pi/4 - 183/10))/10, (88\*exp(-184/5))/5 - (127\*exp(-276/5))/10 + (2^(1/2)\*cos(pi/4 - 92/5))/10, (88\*exp(-37))/5 - (127\*exp(-111/2))/10 + (2^(1/2)\*cos(pi/4 - 37/2))/10, (88\*exp(-186/5))/5 - (127\*exp(-279/5))/10 + (2^(1/2)\*cos(pi/4 - 93/5))/10, (88\*exp(-187/5))/5 - (127\*exp(-561/10))/10 + (2^(1/2)\*cos(pi/4 - 187/10))/10, (88\*exp(-188/5))/5 - (127\*exp(-282/5))/10 + (2^(1/2)\*cos(pi/4 - 94/5))/10, (88\*exp(-189/5))/5 - (127\*exp(-567/10))/10 + (2^(1/2)\*cos(pi/4 - 189/10))/10, (88\*exp(-38))/5 - (127\*exp(-57))/10 + (2^(1/2)\*cos(pi/4 - 19))/10, (88\*exp(-191/5))/5 - (127\*exp(-573/10))/10 + (2^(1/2)\*cos(pi/4 - 191/10))/10, (88\*exp(-192/5))/5 - (127\*exp(-288/5))/10 + (2^(1/2)\*cos(pi/4 - 96/5))/10, (88\*exp(-193/5))/5 - (127\*exp(-579/10))/10 + (2^(1/2)\*cos(pi/4 - 193/10))/10, (88\*exp(-194/5))/5 - (127\*exp(-291/5))/10 + (2^(1/2)\*cos(pi/4 - 97/5))/10, (88\*exp(-39))/5 - (127\*exp(-117/2))/10 + (2^(1/2)\*cos(pi/4 - 39/2))/10, (88\*exp(-196/5))/5 - (127\*exp(-294/5))/10 + (2^(1/2)\*cos(pi/4 - 98/5))/10, (88\*exp(-197/5))/5 - (127\*exp(-591/10))/10 + (2^(1/2)\*cos(pi/4 - 197/10))/10, (88\*exp(-198/5))/5 - (127\*exp(-297/5))/10 + (2^(1/2)\*cos(pi/4 - 99/5))/10, (88\*exp(-199/5))/5 - (127\*exp(-597/10))/10 + (2^(1/2)\*cos(pi/4 - 199/10))/10, (88\*exp(-40))/5 - (127\*exp(-60))/10 + (2^(1/2)\*cos(pi/4 - 20))/10, (88\*exp(-201/5))/5 - (127\*exp(-603/10))/10 + (2^(1/2)\*cos(pi/4 - 201/10))/10, (88\*exp(-202/5))/5 - (127\*exp(-303/5))/10 + (2^(1/2)\*cos(pi/4 - 101/5))/10, (88\*exp(-203/5))/5 - (127\*exp(-609/10))/10 + (2^(1/2)\*cos(pi/4 - 203/10))/10, (88\*exp(-204/5))/5 - (127\*exp(-306/5))/10 + (2^(1/2)\*cos(pi/4 - 102/5))/10, (88\*exp(-41))/5 - (127\*exp(-123/2))/10 + (2^(1/2)\*cos(pi/4 - 41/2))/10, (88\*exp(-206/5))/5 - (127\*exp(-309/5))/10 + (2^(1/2)\*cos(pi/4 - 103/5))/10, (88\*exp(-207/5))/5 - (127\*exp(-621/10))/10 + (2^(1/2)\*cos(pi/4 - 207/10))/10, (88\*exp(-208/5))/5 - (127\*exp(-312/5))/10 + (2^(1/2)\*cos(pi/4 - 104/5))/10, (88\*exp(-209/5))/5 - (127\*exp(-627/10))/10 + (2^(1/2)\*cos(pi/4 - 209/10))/10, (88\*exp(-42))/5 - (127\*exp(-63))/10 + (2^(1/2)\*cos(pi/4 - 21))/10, (88\*exp(-211/5))/5 - (127\*exp(-633/10))/10 + (2^(1/2)\*cos(pi/4 - 211/10))/10, (88\*exp(-212/5))/5 - (127\*exp(-318/5))/10 + (2^(1/2)\*cos(pi/4 - 106/5))/10, (88\*exp(-213/5))/5 - (127\*exp(-639/10))/10 + (2^(1/2)\*cos(pi/4 - 213/10))/10, (88\*exp(-214/5))/5 - (127\*exp(-321/5))/10 + (2^(1/2)\*cos(pi/4 - 107/5))/10, (88\*exp(-43))/5 - (127\*exp(-129/2))/10 + (2^(1/2)\*cos(pi/4 - 43/2))/10, (88\*exp(-216/5))/5 - (127\*exp(-324/5))/10 + (2^(1/2)\*cos(pi/4 - 108/5))/10, (88\*exp(-217/5))/5 - (127\*exp(-651/10))/10 + (2^(1/2)\*cos(pi/4 - 217/10))/10, (88\*exp(-218/5))/5 - (127\*exp(-327/5))/10 + (2^(1/2)\*cos(pi/4 - 109/5))/10, (88\*exp(-219/5))/5 - (127\*exp(-657/10))/10 + (2^(1/2)\*cos(pi/4 - 219/10))/10, (88\*exp(-44))/5 - (127\*exp(-66))/10 + (2^(1/2)\*cos(pi/4 - 22))/10, (88\*exp(-221/5))/5 - (127\*exp(-663/10))/10 + (2^(1/2)\*cos(pi/4 - 221/10))/10, (88\*exp(-222/5))/5 - (127\*exp(-333/5))/10 + (2^(1/2)\*cos(pi/4 - 111/5))/10, (88\*exp(-223/5))/5 - (127\*exp(-669/10))/10 + (2^(1/2)\*cos(pi/4 - 223/10))/10, (88\*exp(-224/5))/5 - (127\*exp(-336/5))/10 + (2^(1/2)\*cos(pi/4 - 112/5))/10, (88\*exp(-45))/5 - (127\*exp(-135/2))/10 + (2^(1/2)\*cos(pi/4 - 45/2))/10, (88\*exp(-226/5))/5 - (127\*exp(-339/5))/10 + (2^(1/2)\*cos(pi/4 - 113/5))/10, (88\*exp(-227/5))/5 - (127\*exp(-681/10))/10 + (2^(1/2)\*cos(pi/4 - 227/10))/10, (88\*exp(-228/5))/5 - (127\*exp(-342/5))/10 + (2^(1/2)\*cos(pi/4 - 114/5))/10, (88\*exp(-229/5))/5 - (127\*exp(-687/10))/10 + (2^(1/2)\*cos(pi/4 - 229/10))/10, (88\*exp(-46))/5 - (127\*exp(-69))/10 + (2^(1/2)\*cos(pi/4 - 23))/10, (88\*exp(-231/5))/5 - (127\*exp(-693/10))/10 + (2^(1/2)\*cos(pi/4 - 231/10))/10, (88\*exp(-232/5))/5 - (127\*exp(-348/5))/10 + (2^(1/2)\*cos(pi/4 - 116/5))/10, (88\*exp(-233/5))/5 - (127\*exp(-699/10))/10 + (2^(1/2)\*cos(pi/4 - 233/10))/10, (88\*exp(-234/5))/5 - (127\*exp(-351/5))/10 + (2^(1/2)\*cos(pi/4 - 117/5))/10, (88\*exp(-47))/5 - (127\*exp(-141/2))/10 + (2^(1/2)\*cos(pi/4 - 47/2))/10, (88\*exp(-236/5))/5 - (127\*exp(-354/5))/10 + (2^(1/2)\*cos(pi/4 - 118/5))/10, (88\*exp(-237/5))/5 - (127\*exp(-711/10))/10 + (2^(1/2)\*cos(pi/4 - 237/10))/10, (88\*exp(-238/5))/5 - (127\*exp(-357/5))/10 + (2^(1/2)\*cos(pi/4 - 119/5))/10, (88\*exp(-239/5))/5 - (127\*exp(-717/10))/10 + (2^(1/2)\*cos(pi/4 - 239/10))/10, (88\*exp(-48))/5 - (127\*exp(-72))/10 + (2^(1/2)\*cos(pi/4 - 24))/10, (88\*exp(-241/5))/5 - (127\*exp(-723/10))/10 + (2^(1/2)\*cos(pi/4 - 241/10))/10, (88\*exp(-242/5))/5 - (127\*exp(-363/5))/10 + (2^(1/2)\*cos(pi/4 - 121/5))/10, (88\*exp(-243/5))/5 - (127\*exp(-729/10))/10 + (2^(1/2)\*cos(pi/4 - 243/10))/10, (88\*exp(-244/5))/5 - (127\*exp(-366/5))/10 + (2^(1/2)\*cos(pi/4 - 122/5))/10, (88\*exp(-49))/5 - (127\*exp(-147/2))/10 + (2^(1/2)\*cos(pi/4 - 49/2))/10, (88\*exp(-246/5))/5 - (127\*exp(-369/5))/10 + (2^(1/2)\*cos(pi/4 - 123/5))/10, (88\*exp(-247/5))/5 - (127\*exp(-741/10))/10 + (2^(1/2)\*cos(pi/4 - 247/10))/10, (88\*exp(-248/5))/5 - (127\*exp(-372/5))/10 + (2^(1/2)\*cos(pi/4 - 124/5))/10, (88\*exp(-249/5))/5 - (127\*exp(-747/10))/10 + (2^(1/2)\*cos(pi/4 - 249/10))/10, (88\*exp(-50))/5 - (127\*exp(-75))/10 + (2^(1/2)\*cos(pi/4 - 25))/10, (88\*exp(-251/5))/5 - (127\*exp(-753/10))/10 + (2^(1/2)\*cos(pi/4 - 251/10))/10, (88\*exp(-252/5))/5 - (127\*exp(-378/5))/10 + (2^(1/2)\*cos(pi/4 - 126/5))/10, (88\*exp(-253/5))/5 - (127\*exp(-759/10))/10 + (2^(1/2)\*cos(pi/4 - 253/10))/10, (88\*exp(-254/5))/5 - (127\*exp(-381/5))/10 + (2^(1/2)\*cos(pi/4 - 127/5))/10, (88\*exp(-51))/5 - (127\*exp(-153/2))/10 + (2^(1/2)\*cos(pi/4 - 51/2))/10, (88\*exp(-256/5))/5 - (127\*exp(-384/5))/10 + (2^(1/2)\*cos(pi/4 - 128/5))/10, (88\*exp(-257/5))/5 - (127\*exp(-771/10))/10 + (2^(1/2)\*cos(pi/4 - 257/10))/10, (88\*exp(-258/5))/5 - (127\*exp(-387/5))/10 + (2^(1/2)\*cos(pi/4 - 129/5))/10, (88\*exp(-259/5))/5 - (127\*exp(-777/10))/10 + (2^(1/2)\*cos(pi/4 - 259/10))/10, (88\*exp(-52))/5 - (127\*exp(-78))/10 + (2^(1/2)\*cos(pi/4 - 26))/10, (88\*exp(-261/5))/5 - (127\*exp(-783/10))/10 + (2^(1/2)\*cos(pi/4 - 261/10))/10, (88\*exp(-262/5))/5 - (127\*exp(-393/5))/10 + (2^(1/2)\*cos(pi/4 - 131/5))/10, (88\*exp(-263/5))/5 - (127\*exp(-789/10))/10 + (2^(1/2)\*cos(pi/4 - 263/10))/10, (88\*exp(-264/5))/5 - (127\*exp(-396/5))/10 + (2^(1/2)\*cos(pi/4 - 132/5))/10, (88\*exp(-53))/5 - (127\*exp(-159/2))/10 + (2^(1/2)\*cos(pi/4 - 53/2))/10, (88\*exp(-266/5))/5 - (127\*exp(-399/5))/10 + (2^(1/2)\*cos(pi/4 - 133/5))/10, (88\*exp(-267/5))/5 - (127\*exp(-801/10))/10 + (2^(1/2)\*cos(pi/4 - 267/10))/10, (88\*exp(-268/5))/5 - (127\*exp(-402/5))/10 + (2^(1/2)\*cos(pi/4 - 134/5))/10, (88\*exp(-269/5))/5 - (127\*exp(-807/10))/10 + (2^(1/2)\*cos(pi/4 - 269/10))/10, (88\*exp(-54))/5 - (127\*exp(-81))/10 + (2^(1/2)\*cos(pi/4 - 27))/10, (88\*exp(-271/5))/5 - (127\*exp(-813/10))/10 + (2^(1/2)\*cos(pi/4 - 271/10))/10, (88\*exp(-272/5))/5 - (127\*exp(-408/5))/10 + (2^(1/2)\*cos(pi/4 - 136/5))/10, (88\*exp(-273/5))/5 - (127\*exp(-819/10))/10 + (2^(1/2)\*cos(pi/4 - 273/10))/10, (88\*exp(-274/5))/5 - (127\*exp(-411/5))/10 + (2^(1/2)\*cos(pi/4 - 137/5))/10, (88\*exp(-55))/5 - (127\*exp(-165/2))/10 + (2^(1/2)\*cos(pi/4 - 55/2))/10, (88\*exp(-276/5))/5 - (127\*exp(-414/5))/10 + (2^(1/2)\*cos(pi/4 - 138/5))/10, (88\*exp(-277/5))/5 - (127\*exp(-831/10))/10 + (2^(1/2)\*cos(pi/4 - 277/10))/10, (88\*exp(-278/5))/5 - (127\*exp(-417/5))/10 + (2^(1/2)\*cos(pi/4 - 139/5))/10, (88\*exp(-279/5))/5 - (127\*exp(-837/10))/10 + (2^(1/2)\*cos(pi/4 - 279/10))/10, (88\*exp(-56))/5 - (127\*exp(-84))/10 + (2^(1/2)\*cos(pi/4 - 28))/10, (88\*exp(-281/5))/5 - (127\*exp(-843/10))/10 + (2^(1/2)\*cos(pi/4 - 281/10))/10, (88\*exp(-282/5))/5 - (127\*exp(-423/5))/10 + (2^(1/2)\*cos(pi/4 - 141/5))/10, (88\*exp(-283/5))/5 - (127\*exp(-849/10))/10 + (2^(1/2)\*cos(pi/4 - 283/10))/10, (88\*exp(-284/5))/5 - (127\*exp(-426/5))/10 + (2^(1/2)\*cos(pi/4 - 142/5))/10, (88\*exp(-57))/5 - (127\*exp(-171/2))/10 + (2^(1/2)\*cos(pi/4 - 57/2))/10, (88\*exp(-286/5))/5 - (127\*exp(-429/5))/10 + (2^(1/2)\*cos(pi/4 - 143/5))/10, (88\*exp(-287/5))/5 - (127\*exp(-861/10))/10 + (2^(1/2)\*cos(pi/4 - 287/10))/10, (88\*exp(-288/5))/5 - (127\*exp(-432/5))/10 + (2^(1/2)\*cos(pi/4 - 144/5))/10, (88\*exp(-289/5))/5 - (127\*exp(-867/10))/10 + (2^(1/2)\*cos(pi/4 - 289/10))/10, (88\*exp(-58))/5 - (127\*exp(-87))/10 + (2^(1/2)\*cos(pi/4 - 29))/10, (88\*exp(-291/5))/5 - (127\*exp(-873/10))/10 + (2^(1/2)\*cos(pi/4 - 291/10))/10, (88\*exp(-292/5))/5 - (127\*exp(-438/5))/10 + (2^(1/2)\*cos(pi/4 - 146/5))/10, (88\*exp(-293/5))/5 - (127\*exp(-879/10))/10 + (2^(1/2)\*cos(pi/4 - 293/10))/10, (88\*exp(-294/5))/5 - (127\*exp(-441/5))/10 + (2^(1/2)\*cos(pi/4 - 147/5))/10, (88\*exp(-59))/5 - (127\*exp(-177/2))/10 + (2^(1/2)\*cos(pi/4 - 59/2))/10, (88\*exp(-296/5))/5 - (127\*exp(-444/5))/10 + (2^(1/2)\*cos(pi/4 - 148/5))/10, (88\*exp(-297/5))/5 - (127\*exp(-891/10))/10 + (2^(1/2)\*cos(pi/4 - 297/10))/10, (88\*exp(-298/5))/5 - (127\*exp(-447/5))/10 + (2^(1/2)\*cos(pi/4 - 149/5))/10, (88\*exp(-299/5))/5 - (127\*exp(-897/10))/10 + (2^(1/2)\*cos(pi/4 - 299/10))/10, (88\*exp(-60))/5 - (127\*exp(-90))/10 + (2^(1/2)\*cos(pi/4 - 30))/10, (88\*exp(-301/5))/5 - (127\*exp(-903/10))/10 + (2^(1/2)\*cos(pi/4 - 301/10))/10, (88\*exp(-302/5))/5 - (127\*exp(-453/5))/10 + (2^(1/2)\*cos(pi/4 - 151/5))/10, (88\*exp(-303/5))/5 - (127\*exp(-909/10))/10 + (2^(1/2)\*cos(pi/4 - 303/10))/10, (88\*exp(-304/5))/5 - (127\*exp(-456/5))/10 + (2^(1/2)\*cos(pi/4 - 152/5))/10, (88\*exp(-61))/5 - (127\*exp(-183/2))/10 + (2^(1/2)\*cos(pi/4 - 61/2))/10, (88\*exp(-306/5))/5 - (127\*exp(-459/5))/10 + (2^(1/2)\*cos(pi/4 - 153/5))/10, (88\*exp(-307/5))/5 - (127\*exp(-921/10))/10 + (2^(1/2)\*cos(pi/4 - 307/10))/10, (88\*exp(-308/5))/5 - (127\*exp(-462/5))/10 + (2^(1/2)\*cos(pi/4 - 154/5))/10, (88\*exp(-309/5))/5 - (127\*exp(-927/10))/10 + (2^(1/2)\*cos(pi/4 - 309/10))/10, (88\*exp(-62))/5 - (127\*exp(-93))/10 + (2^(1/2)\*cos(pi/4 - 31))/10, (88\*exp(-311/5))/5 - (127\*exp(-933/10))/10 + (2^(1/2)\*cos(pi/4 - 311/10))/10, (88\*exp(-312/5))/5 - (127\*exp(-468/5))/10 + (2^(1/2)\*cos(pi/4 - 156/5))/10, (88\*exp(-313/5))/5 - (127\*exp(-939/10))/10 + (2^(1/2)\*cos(pi/4 - 313/10))/10, (88\*exp(-314/5))/5 - (127\*exp(-471/5))/10 + (2^(1/2)\*cos(pi/4 - 157/5))/10, (88\*exp(-63))/5 - (127\*exp(-189/2))/10 + (2^(1/2)\*cos(pi/4 - 63/2))/10, (88\*exp(-316/5))/5 - (127\*exp(-474/5))/10 + (2^(1/2)\*cos(pi/4 - 158/5))/10, (88\*exp(-317/5))/5 - (127\*exp(-951/10))/10 + (2^(1/2)\*cos(pi/4 - 317/10))/10, (88\*exp(-318/5))/5 - (127\*exp(-477/5))/10 + (2^(1/2)\*cos(pi/4 - 159/5))/10, (88\*exp(-319/5))/5 - (127\*exp(-957/10))/10 + (2^(1/2)\*cos(pi/4 - 319/10))/10, (88\*exp(-64))/5 - (127\*exp(-96))/10 + (2^(1/2)\*cos(pi/4 - 32))/10, (88\*exp(-321/5))/5 - (127\*exp(-963/10))/10 + (2^(1/2)\*cos(pi/4 - 321/10))/10, (88\*exp(-322/5))/5 - (127\*exp(-483/5))/10 + (2^(1/2)\*cos(pi/4 - 161/5))/10, (88\*exp(-323/5))/5 - (127\*exp(-969/10))/10 + (2^(1/2)\*cos(pi/4 - 323/10))/10, (88\*exp(-324/5))/5 - (127\*exp(-486/5))/10 + (2^(1/2)\*cos(pi/4 - 162/5))/10, (88\*exp(-65))/5 - (127\*exp(-195/2))/10 + (2^(1/2)\*cos(pi/4 - 65/2))/10, (88\*exp(-326/5))/5 - (127\*exp(-489/5))/10 + (2^(1/2)\*cos(pi/4 - 163/5))/10, (88\*exp(-327/5))/5 - (127\*exp(-981/10))/10 + (2^(1/2)\*cos(pi/4 - 327/10))/10, (88\*exp(-328/5))/5 - (127\*exp(-492/5))/10 + (2^(1/2)\*cos(pi/4 - 164/5))/10, (88\*exp(-329/5))/5 - (127\*exp(-987/10))/10 + (2^(1/2)\*cos(pi/4 - 329/10))/10, (88\*exp(-66))/5 - (127\*exp(-99))/10 + (2^(1/2)\*cos(pi/4 - 33))/10, (88\*exp(-331/5))/5 - (127\*exp(-993/10))/10 + (2^(1/2)\*cos(pi/4 - 331/10))/10, (88\*exp(-332/5))/5 - (127\*exp(-498/5))/10 + (2^(1/2)\*cos(pi/4 - 166/5))/10, (88\*exp(-333/5))/5 - (127\*exp(-999/10))/10 + (2^(1/2)\*cos(pi/4 - 333/10))/10, (88\*exp(-334/5))/5 - (127\*exp(-501/5))/10 + (2^(1/2)\*cos(pi/4 - 167/5))/10, (88\*exp(-67))/5 - (127\*exp(-201/2))/10 + (2^(1/2)\*cos(pi/4 - 67/2))/10, (88\*exp(-336/5))/5 - (127\*exp(-504/5))/10 + (2^(1/2)\*cos(pi/4 - 168/5))/10, (88\*exp(-337/5))/5 - (127\*exp(-1011/10))/10 + (2^(1/2)\*cos(pi/4 - 337/10))/10, (88\*exp(-338/5))/5 - (127\*exp(-507/5))/10 + (2^(1/2)\*cos(pi/4 - 169/5))/10, (88\*exp(-339/5))/5 - (127\*exp(-1017/10))/10 + (2^(1/2)\*cos(pi/4 - 339/10))/10, (88\*exp(-68))/5 - (127\*exp(-102))/10 + (2^(1/2)\*cos(pi/4 - 34))/10, (88\*exp(-341/5))/5 - (127\*exp(-1023/10))/10 + (2^(1/2)\*cos(pi/4 - 341/10))/10, (88\*exp(-342/5))/5 - (127\*exp(-513/5))/10 + (2^(1/2)\*cos(pi/4 - 171/5))/10, (88\*exp(-343/5))/5 - (127\*exp(-1029/10))/10 + (2^(1/2)\*cos(pi/4 - 343/10))/10, (88\*exp(-344/5))/5 - (127\*exp(-516/5))/10 + (2^(1/2)\*cos(pi/4 - 172/5))/10, (88\*exp(-69))/5 - (127\*exp(-207/2))/10 + (2^(1/2)\*cos(pi/4 - 69/2))/10, (88\*exp(-346/5))/5 - (127\*exp(-519/5))/10 + (2^(1/2)\*cos(pi/4 - 173/5))/10, (88\*exp(-347/5))/5 - (127\*exp(-1041/10))/10 + (2^(1/2)\*cos(pi/4 - 347/10))/10, (88\*exp(-348/5))/5 - (127\*exp(-522/5))/10 + (2^(1/2)\*cos(pi/4 - 174/5))/10, (88\*exp(-349/5))/5 - (127\*exp(-1047/10))/10 + (2^(1/2)\*cos(pi/4 - 349/10))/10, (88\*exp(-70))/5 - (127\*exp(-105))/10 + (2^(1/2)\*cos(pi/4 - 35))/10, (88\*exp(-351/5))/5 - (127\*exp(-1053/10))/10 + (2^(1/2)\*cos(pi/4 - 351/10))/10, (88\*exp(-352/5))/5 - (127\*exp(-528/5))/10 + (2^(1/2)\*cos(pi/4 - 176/5))/10, (88\*exp(-353/5))/5 - (127\*exp(-1059/10))/10 + (2^(1/2)\*cos(pi/4 - 353/10))/10, (88\*exp(-354/5))/5 - (127\*exp(-531/5))/10 + (2^(1/2)\*cos(pi/4 - 177/5))/10, (88\*exp(-71))/5 - (127\*exp(-213/2))/10 + (2^(1/2)\*cos(pi/4 - 71/2))/10, (88\*exp(-356/5))/5 - (127\*exp(-534/5))/10 + (2^(1/2)\*cos(pi/4 - 178/5))/10, (88\*exp(-357/5))/5 - (127\*exp(-1071/10))/10 + (2^(1/2)\*cos(pi/4 - 357/10))/10, (88\*exp(-358/5))/5 - (127\*exp(-537/5))/10 + (2^(1/2)\*cos(pi/4 - 179/5))/10, (88\*exp(-359/5))/5 - (127\*exp(-1077/10))/10 + (2^(1/2)\*cos(pi/4 - 359/10))/10, (88\*exp(-72))/5 - (127\*exp(-108))/10 + (2^(1/2)\*cos(pi/4 - 36))/10, (88\*exp(-361/5))/5 - (127\*exp(-1083/10))/10 + (2^(1/2)\*cos(pi/4 - 361/10))/10, (88\*exp(-362/5))/5 - (127\*exp(-543/5))/10 + (2^(1/2)\*cos(pi/4 - 181/5))/10, (88\*exp(-363/5))/5 - (127\*exp(-1089/10))/10 + (2^(1/2)\*cos(pi/4 - 363/10))/10, (88\*exp(-364/5))/5 - (127\*exp(-546/5))/10 + (2^(1/2)\*cos(pi/4 - 182/5))/10, (88\*exp(-73))/5 - (127\*exp(-219/2))/10 + (2^(1/2)\*cos(pi/4 - 73/2))/10, (88\*exp(-366/5))/5 - (127\*exp(-549/5))/10 + (2^(1/2)\*cos(pi/4 - 183/5))/10, (88\*exp(-367/5))/5 - (127\*exp(-1101/10))/10 + (2^(1/2)\*cos(pi/4 - 367/10))/10, (88\*exp(-368/5))/5 - (127\*exp(-552/5))/10 + (2^(1/2)\*cos(pi/4 - 184/5))/10, (88\*exp(-369/5))/5 - (127\*exp(-1107/10))/10 + (2^(1/2)\*cos(pi/4 - 369/10))/10, (88\*exp(-74))/5 - (127\*exp(-111))/10 + (2^(1/2)\*cos(pi/4 - 37))/10, (88\*exp(-371/5))/5 - (127\*exp(-1113/10))/10 + (2^(1/2)\*cos(pi/4 - 371/10))/10, (88\*exp(-372/5))/5 - (127\*exp(-558/5))/10 + (2^(1/2)\*cos(pi/4 - 186/5))/10, (88\*exp(-373/5))/5 - (127\*exp(-1119/10))/10 + (2^(1/2)\*cos(pi/4 - 373/10))/10, (88\*exp(-374/5))/5 - (127\*exp(-561/5))/10 + (2^(1/2)\*cos(pi/4 - 187/5))/10, (88\*exp(-75))/5 - (127\*exp(-225/2))/10 + (2^(1/2)\*cos(pi/4 - 75/2))/10, (88\*exp(-376/5))/5 - (127\*exp(-564/5))/10 + (2^(1/2)\*cos(pi/4 - 188/5))/10, (88\*exp(-377/5))/5 - (127\*exp(-1131/10))/10 + (2^(1/2)\*cos(pi/4 - 377/10))/10, (88\*exp(-378/5))/5 - (127\*exp(-567/5))/10 + (2^(1/2)\*cos(pi/4 - 189/5))/10, (88\*exp(-379/5))/5 - (127\*exp(-1137/10))/10 + (2^(1/2)\*cos(pi/4 - 379/10))/10, (88\*exp(-76))/5 - (127\*exp(-114))/10 + (2^(1/2)\*cos(pi/4 - 38))/10, (88\*exp(-381/5))/5 - (127\*exp(-1143/10))/10 + (2^(1/2)\*cos(pi/4 - 381/10))/10, (88\*exp(-382/5))/5 - (127\*exp(-573/5))/10 + (2^(1/2)\*cos(pi/4 - 191/5))/10, (88\*exp(-383/5))/5 - (127\*exp(-1149/10))/10 + (2^(1/2)\*cos(pi/4 - 383/10))/10, (88\*exp(-384/5))/5 - (127\*exp(-576/5))/10 + (2^(1/2)\*cos(pi/4 - 192/5))/10, (88\*exp(-77))/5 - (127\*exp(-231/2))/10 + (2^(1/2)\*cos(pi/4 - 77/2))/10, (88\*exp(-386/5))/5 - (127\*exp(-579/5))/10 + (2^(1/2)\*cos(pi/4 - 193/5))/10, (88\*exp(-387/5))/5 - (127\*exp(-1161/10))/10 + (2^(1/2)\*cos(pi/4 - 387/10))/10, (88\*exp(-388/5))/5 - (127\*exp(-582/5))/10 + (2^(1/2)\*cos(pi/4 - 194/5))/10, (88\*exp(-389/5))/5 - (127\*exp(-1167/10))/10 + (2^(1/2)\*cos(pi/4 - 389/10))/10, (88\*exp(-78))/5 - (127\*exp(-117))/10 + (2^(1/2)\*cos(pi/4 - 39))/10, (88\*exp(-391/5))/5 - (127\*exp(-1173/10))/10 + (2^(1/2)\*cos(pi/4 - 391/10))/10, (88\*exp(-392/5))/5 - (127\*exp(-588/5))/10 + (2^(1/2)\*cos(pi/4 - 196/5))/10, (88\*exp(-393/5))/5 - (127\*exp(-1179/10))/10 + (2^(1/2)\*cos(pi/4 - 393/10))/10, (88\*exp(-394/5))/5 - (127\*exp(-591/5))/10 + (2^(1/2)\*cos(pi/4 - 197/5))/10, (88\*exp(-79))/5 - (127\*exp(-237/2))/10 + (2^(1/2)\*cos(pi/4 - 79/2))/10, (88\*exp(-396/5))/5 - (127\*exp(-594/5))/10 + (2^(1/2)\*cos(pi/4 - 198/5))/10, (88\*exp(-397/5))/5 - (127\*exp(-1191/10))/10 + (2^(1/2)\*cos(pi/4 - 397/10))/10, (88\*exp(-398/5))/5 - (127\*exp(-597/5))/10 + (2^(1/2)\*cos(pi/4 - 199/5))/10, (88\*exp(-399/5))/5 - (127\*exp(-1197/10))/10 + (2^(1/2)\*cos(pi/4 - 399/10))/10, (88\*exp(-80))/5 - (127\*exp(-120))/10 + (2^(1/2)\*cos(pi/4 - 40))/10, (88\*exp(-401/5))/5 - (127\*exp(-1203/10))/10 + (2^(1/2)\*cos(pi/4 - 401/10))/10, (88\*exp(-402/5))/5 - (127\*exp(-603/5))/10 + (2^(1/2)\*cos(pi/4 - 201/5))/10, (88\*exp(-403/5))/5 - (127\*exp(-1209/10))/10 + (2^(1/2)\*cos(pi/4 - 403/10))/10, (88\*exp(-404/5))/5 - (127\*exp(-606/5))/10 + (2^(1/2)\*cos(pi/4 - 202/5))/10, (88\*exp(-81))/5 - (127\*exp(-243/2))/10 + (2^(1/2)\*cos(pi/4 - 81/2))/10, (88\*exp(-406/5))/5 - (127\*exp(-609/5))/10 + (2^(1/2)\*cos(pi/4 - 203/5))/10, (88\*exp(-407/5))/5 - (127\*exp(-1221/10))/10 + (2^(1/2)\*cos(pi/4 - 407/10))/10, (88\*exp(-408/5))/5 - (127\*exp(-612/5))/10 + (2^(1/2)\*cos(pi/4 - 204/5))/10, (88\*exp(-409/5))/5 - (127\*exp(-1227/10))/10 + (2^(1/2)\*cos(pi/4 - 409/10))/10, (88\*exp(-82))/5 - (127\*exp(-123))/10 + (2^(1/2)\*cos(pi/4 - 41))/10, (88\*exp(-411/5))/5 - (127\*exp(-1233/10))/10 + (2^(1/2)\*cos(pi/4 - 411/10))/10, (88\*exp(-412/5))/5 - (127\*exp(-618/5))/10 + (2^(1/2)\*cos(pi/4 - 206/5))/10, (88\*exp(-413/5))/5 - (127\*exp(-1239/10))/10 + (2^(1/2)\*cos(pi/4 - 413/10))/10, (88\*exp(-414/5))/5 - (127\*exp(-621/5))/10 + (2^(1/2)\*cos(pi/4 - 207/5))/10, (88\*exp(-83))/5 - (127\*exp(-249/2))/10 + (2^(1/2)\*cos(pi/4 - 83/2))/10, (88\*exp(-416/5))/5 - (127\*exp(-624/5))/10 + (2^(1/2)\*cos(pi/4 - 208/5))/10, (88\*exp(-417/5))/5 - (127\*exp(-1251/10))/10 + (2^(1/2)\*cos(pi/4 - 417/10))/10, (88\*exp(-418/5))/5 - (127\*exp(-627/5))/10 + (2^(1/2)\*cos(pi/4 - 209/5))/10, (88\*exp(-419/5))/5 - (127\*exp(-1257/10))/10 + (2^(1/2)\*cos(pi/4 - 419/10))/10, (88\*exp(-84))/5 - (127\*exp(-126))/10 + (2^(1/2)\*cos(pi/4 - 42))/10, (88\*exp(-421/5))/5 - (127\*exp(-1263/10))/10 + (2^(1/2)\*cos(pi/4 - 421/10))/10, (88\*exp(-422/5))/5 - (127\*exp(-633/5))/10 + (2^(1/2)\*cos(pi/4 - 211/5))/10, (88\*exp(-423/5))/5 - (127\*exp(-1269/10))/10 + (2^(1/2)\*cos(pi/4 - 423/10))/10, (88\*exp(-424/5))/5 - (127\*exp(-636/5))/10 + (2^(1/2)\*cos(pi/4 - 212/5))/10, (88\*exp(-85))/5 - (127\*exp(-255/2))/10 + (2^(1/2)\*cos(pi/4 - 85/2))/10, (88\*exp(-426/5))/5 - (127\*exp(-639/5))/10 + (2^(1/2)\*cos(pi/4 - 213/5))/10, (88\*exp(-427/5))/5 - (127\*exp(-1281/10))/10 + (2^(1/2)\*cos(pi/4 - 427/10))/10, (88\*exp(-428/5))/5 - (127\*exp(-642/5))/10 + (2^(1/2)\*cos(pi/4 - 214/5))/10, (88\*exp(-429/5))/5 - (127\*exp(-1287/10))/10 + (2^(1/2)\*cos(pi/4 - 429/10))/10, (88\*exp(-86))/5 - (127\*exp(-129))/10 + (2^(1/2)\*cos(pi/4 - 43))/10, (88\*exp(-431/5))/5 - (127\*exp(-1293/10))/10 + (2^(1/2)\*cos(pi/4 - 431/10))/10, (88\*exp(-432/5))/5 - (127\*exp(-648/5))/10 + (2^(1/2)\*cos(pi/4 - 216/5))/10, (88\*exp(-433/5))/5 - (127\*exp(-1299/10))/10 + (2^(1/2)\*cos(pi/4 - 433/10))/10, (88\*exp(-434/5))/5 - (127\*exp(-651/5))/10 + (2^(1/2)\*cos(pi/4 - 217/5))/10, (88\*exp(-87))/5 - (127\*exp(-261/2))/10 + (2^(1/2)\*cos(pi/4 - 87/2))/10, (88\*exp(-436/5))/5 - (127\*exp(-654/5))/10 + (2^(1/2)\*cos(pi/4 - 218/5))/10, (88\*exp(-437/5))/5 - (127\*exp(-1311/10))/10 + (2^(1/2)\*cos(pi/4 - 437/10))/10, (88\*exp(-438/5))/5 - (12... 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>>



**2.**

commandwindow

clear

clc

close all

syms T1(t) T2(t)

tn=[0:0.1:3.5]

z=[diff(T1,t)+3\*T2==exp(-2\*t),diff(T2,t)-3\*T1==exp(2\*t)]

zcond=[T1(0)==30,T2(0)==30]

v = dsolve(z,zcond)

T1= v.T1

T2= v.T2

TA=subs(T1,tn)

figure(1)

plot(tn,TA)

xlabel('time(min)')

ylabel('temperature 1(celsius)')

figure(2)

TB =subs(T2,tn)

plot(tn,TB)

xlabel('time(min')

ylabel('temperature 2(celsius)')

grid on

grid minor

axis tight

ANSWER:

tn =

 Columns 1 through 12

 0 0.1000 0.2000 0.3000 0.4000 0.5000 0.6000 0.7000 0.8000 0.9000 1.0000 1.1000

 Columns 13 through 24

 1.2000 1.3000 1.4000 1.5000 1.6000 1.7000 1.8000 1.9000 2.0000 2.1000 2.2000 2.3000

 Columns 25 through 36

 2.4000 2.5000 2.6000 2.7000 2.8000 2.9000 3.0000 3.1000 3.2000 3.3000 3.4000 3.5000

z(t) =

[ 3\*T2(t) + diff(T1(t), t) == exp(-2\*t), diff(T2(t), t) - 3\*T1(t) == exp(2\*t)]

zcond =

[ T1(0) == 30, T2(0) == 30]

v =

 struct with fields:

 T2: [1×1 sym]

 T1: [1×1 sym]

T1 =

(5\*12170^(1/2)\*cos(3\*t + atan(77/79)))/13 - (3\*exp(2\*t))/13 - (2\*exp(-2\*t))/13

T2 =

(3\*exp(-2\*t))/13 + (2\*exp(2\*t))/13 + (5\*12170^(1/2)\*cos(3\*t - atan(79/77)))/13

TA =

[ 30, (5\*12170^(1/2)\*cos(atan(77/79) + 3/10))/13 - (3\*exp(1/5))/13 - (2\*exp(-1/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 3/5))/13 - (3\*exp(2/5))/13 - (2\*exp(-2/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 9/10))/13 - (3\*exp(3/5))/13 - (2\*exp(-3/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 6/5))/13 - (3\*exp(4/5))/13 - (2\*exp(-4/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 3/2))/13 - (3\*exp(1))/13 - (2\*exp(-1))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 9/5))/13 - (3\*exp(6/5))/13 - (2\*exp(-6/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 21/10))/13 - (3\*exp(7/5))/13 - (2\*exp(-7/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 12/5))/13 - (3\*exp(8/5))/13 - (2\*exp(-8/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 27/10))/13 - (3\*exp(9/5))/13 - (2\*exp(-9/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 3))/13 - (3\*exp(2))/13 - (2\*exp(-2))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 33/10))/13 - (3\*exp(11/5))/13 - (2\*exp(-11/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 18/5))/13 - (3\*exp(12/5))/13 - (2\*exp(-12/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 39/10))/13 - (3\*exp(13/5))/13 - (2\*exp(-13/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 21/5))/13 - (3\*exp(14/5))/13 - (2\*exp(-14/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 9/2))/13 - (3\*exp(3))/13 - (2\*exp(-3))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 24/5))/13 - (3\*exp(16/5))/13 - (2\*exp(-16/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 51/10))/13 - (3\*exp(17/5))/13 - (2\*exp(-17/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 27/5))/13 - (3\*exp(18/5))/13 - (2\*exp(-18/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 57/10))/13 - (3\*exp(19/5))/13 - (2\*exp(-19/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 6))/13 - (3\*exp(4))/13 - (2\*exp(-4))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 63/10))/13 - (3\*exp(21/5))/13 - (2\*exp(-21/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 33/5))/13 - (3\*exp(22/5))/13 - (2\*exp(-22/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 69/10))/13 - (3\*exp(23/5))/13 - (2\*exp(-23/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 36/5))/13 - (3\*exp(24/5))/13 - (2\*exp(-24/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 15/2))/13 - (3\*exp(5))/13 - (2\*exp(-5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 39/5))/13 - (3\*exp(26/5))/13 - (2\*exp(-26/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 81/10))/13 - (3\*exp(27/5))/13 - (2\*exp(-27/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 42/5))/13 - (3\*exp(28/5))/13 - (2\*exp(-28/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 87/10))/13 - (3\*exp(29/5))/13 - (2\*exp(-29/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 9))/13 - (3\*exp(6))/13 - (2\*exp(-6))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 93/10))/13 - (3\*exp(31/5))/13 - (2\*exp(-31/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 48/5))/13 - (3\*exp(32/5))/13 - (2\*exp(-32/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 99/10))/13 - (3\*exp(33/5))/13 - (2\*exp(-33/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 51/5))/13 - (3\*exp(34/5))/13 - (2\*exp(-34/5))/13, (5\*12170^(1/2)\*cos(atan(77/79) + 21/2))/13 - (3\*exp(7))/13 - (2\*exp(-7))/13]

TB =

[ 30, (3\*exp(-1/5))/13 + (2\*exp(1/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 3/10))/13, (3\*exp(-2/5))/13 + (2\*exp(2/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 3/5))/13, (3\*exp(-3/5))/13 + (2\*exp(3/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 9/10))/13, (3\*exp(-4/5))/13 + (2\*exp(4/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 6/5))/13, (3\*exp(-1))/13 + (2\*exp(1))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 3/2))/13, (3\*exp(-6/5))/13 + (2\*exp(6/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 9/5))/13, (3\*exp(-7/5))/13 + (2\*exp(7/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 21/10))/13, (3\*exp(-8/5))/13 + (2\*exp(8/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 12/5))/13, (3\*exp(-9/5))/13 + (2\*exp(9/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 27/10))/13, (3\*exp(-2))/13 + (2\*exp(2))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 3))/13, (3\*exp(-11/5))/13 + (2\*exp(11/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 33/10))/13, (3\*exp(-12/5))/13 + (2\*exp(12/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 18/5))/13, (3\*exp(-13/5))/13 + (2\*exp(13/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 39/10))/13, (3\*exp(-14/5))/13 + (2\*exp(14/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 21/5))/13, (3\*exp(-3))/13 + (2\*exp(3))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 9/2))/13, (3\*exp(-16/5))/13 + (2\*exp(16/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 24/5))/13, (3\*exp(-17/5))/13 + (2\*exp(17/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 51/10))/13, (3\*exp(-18/5))/13 + (2\*exp(18/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 27/5))/13, (3\*exp(-19/5))/13 + (2\*exp(19/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 57/10))/13, (3\*exp(-4))/13 + (2\*exp(4))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 6))/13, (3\*exp(-21/5))/13 + (2\*exp(21/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 63/10))/13, (3\*exp(-22/5))/13 + (2\*exp(22/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 33/5))/13, (3\*exp(-23/5))/13 + (2\*exp(23/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 69/10))/13, (3\*exp(-24/5))/13 + (2\*exp(24/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 36/5))/13, (3\*exp(-5))/13 + (2\*exp(5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 15/2))/13, (3\*exp(-26/5))/13 + (2\*exp(26/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 39/5))/13, (3\*exp(-27/5))/13 + (2\*exp(27/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 81/10))/13, (3\*exp(-28/5))/13 + (2\*exp(28/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 42/5))/13, (3\*exp(-29/5))/13 + (2\*exp(29/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 87/10))/13, (3\*exp(-6))/13 + (2\*exp(6))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 9))/13, (3\*exp(-31/5))/13 + (2\*exp(31/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 93/10))/13, (3\*exp(-32/5))/13 + (2\*exp(32/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 48/5))/13, (3\*exp(-33/5))/13 + (2\*exp(33/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 99/10))/13, (3\*exp(-34/5))/13 + (2\*exp(34/5))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 51/5))/13, (3\*exp(-7))/13 + (2\*exp(7))/13 + (5\*12170^(1/2)\*cos(atan(79/77) - 21/2))/13]

FIGURE 1



 FIGURE 2



**3.**

commandwindow

clear

clc

syms I(t) L R E

z= L\*diff(I,t)+R\*I==E

v= dsolve(z)

ANSWER:

z(t) =

L\*diff(I(t), t) + R\*I(t) == E

v =

(E - C5\*exp(-(R\*t)/L))/R

**4.**

commandwindow

clear

clc

syms k a t w

ft=k\*exp(-a\*t)\*cos(w\*t)

fs=laplace(ft)

pretty(fs)

ANSWER:

ft =

k\*exp(-a\*t)\*cos(t\*w)

fs =

(k\*(a + s))/((a + s)^2 + w^2)

 k (a + s)

-------------

 2 2

(a + s) + w

**5.**

commandwindow

clear

clc

syms s

Fs= pi/(s^2+10\*pi\*s+24\*pi\*pi)

Ft= ilaplace(Fs)

ANSWER:

Fs =

pi/(s^2 + 10\*pi\*s + 8334140006820045/35184372088832)

Ft =

(pi\*sinh(t\*(25\*pi^2 - 8334140006820045/35184372088832)^(1/2))\*exp(-5\*pi\*t))/(25\*pi^2 - 8334140006820045/35184372088832)^(1/2)