**OHIA EMMANUEL NWACHUKWU**

**CHEMICAL ENGINEERING**

**15/ENG07/033**

**ENG 381 TEST**

**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)