

GCL (GNU Common Lisp) 2.6.7 ANSI Jul 9 2013 00:29:10
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 Binary License: GPL due to GPL'ed components: (READLINE UNEXEC)
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 Dedicated to the memory of W. Schelter
 Use (help) to get some basic information on how to use GCL.
 Maxima 5.9.0 <http://maxima.sourceforge.net>
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 Dedicated to the memory of William Schelter.
 This is a development version of Maxima. The function bug_report()
 provides bug reporting information.

(C1) load("eigen");

Warning - you are redefining the MACSYMA function EIGENVALUES

Warning - you are redefining the MACSYMA function EIGENVECTORS

(D 1) /usr/local/share/maxima/5.9.0/share/matrix/eigen . mac

(C21) load("kenrou-1.4.4.mac");

(D 21) kenrou - 1.4.4. mac

(C3) A : matrix([2,1,1],[1,2,1],[1,1,2]);

(D 3)
$$\begin{pmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 1 & 1 & 2 \end{pmatrix}$$

(C4) P : diagonalizer(A);

(D 4)
$$\begin{pmatrix} \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{3}} \\ \frac{1}{\sqrt{2}} & 0 & -\frac{1}{\sqrt{2}} \\ -\frac{\sqrt{2}}{2\sqrt{3}} & \frac{\sqrt{2}}{\sqrt{3}} & -\frac{\sqrt{2}}{2\sqrt{3}} \end{pmatrix}$$

(C5) diagonalize(A);

(D 5)
$$\begin{pmatrix} 4 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

(C6) Q : transpose(P);

$$(D 6) \begin{pmatrix} \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{2}} & -\frac{\sqrt{2}}{2\sqrt{3}} \\ \frac{1}{\sqrt{3}} & 0 & \frac{\sqrt{2}}{\sqrt{3}} \\ \frac{1}{\sqrt{3}} & -\frac{1}{\sqrt{2}} & -\frac{\sqrt{2}}{2\sqrt{3}} \end{pmatrix}$$

(C7) ratsimp(P) . A . ratsimp(Q);

$$(D 7) \begin{pmatrix} 4 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

(C8) DA : matrix([4^n, 0, 0], [0, 1, 0], [0, 0, 1]);

$$(D 8) \begin{pmatrix} 4^n & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

(C9) AN : ratsimp(Q) . DA . ratsimp(P);

$$(D 9) \begin{pmatrix} \frac{4^n}{3} + \frac{2}{3} & \frac{4^n}{3} - \frac{1}{3} & \frac{4^n}{3} - \frac{1}{3} \\ \frac{4^n}{3} - \frac{1}{3} & \frac{4^n}{3} + \frac{2}{3} & \frac{4^n}{3} - \frac{1}{3} \\ \frac{4^n}{3} - \frac{1}{3} & \frac{4^n}{3} - \frac{1}{3} & \frac{4^n}{3} + \frac{2}{3} \end{pmatrix}$$

(C10) eigenvectors(A);

(D 10) [[[4, 1], [1, 2]], [1, 1, 1], [1, 0, -1], [0, 1, -1]]

(C11) L : rest(eigenvectors(A));

(D 11) [[1, 1, 1], [1, 0, -1], [0, 1, -1]]

(C12) QQ : unitarize(ltom(L));

$$(D 12) \begin{pmatrix} \frac{1}{\sqrt{2}} & \frac{\sqrt{2}}{2\sqrt{3}} & \frac{1}{\sqrt{3}} \\ \frac{1}{\sqrt{2}} & -\frac{\sqrt{2}}{2\sqrt{3}} & -\frac{1}{\sqrt{3}} \\ 0 & \frac{\sqrt{2}}{\sqrt{3}} & -\frac{1}{\sqrt{3}} \end{pmatrix}$$

(C13) QQQ : ltom(gson(L));

$$(D 13) \begin{pmatrix} \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{3}} \\ \frac{1}{\sqrt{2}} & 0 & -\frac{1}{\sqrt{2}} \\ -\frac{\sqrt{2}}{2\sqrt{3}} & \frac{\sqrt{2}}{\sqrt{3}} & -\frac{\sqrt{2}}{2\sqrt{3}} \end{pmatrix}$$

(C14) `kill(A, P, Q, L, DA, AN, QQ, QQQ);`

(D 14) *DONE*

(C15) `A : matrix([1,2,3],[4,5,6],[7,8,0]);`

(D 15)
$$\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 0 \end{pmatrix}$$

(C16) `kaidan(copymatrix(A));`

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & -3 & -6 \\ 7 & 8 & 0 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & -3 & -6 \\ 0 & -6 & -21 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & 1 & 2 \\ 0 & -6 & -21 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & -1 \\ 0 & 1 & 2 \\ 0 & -6 & -21 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & -1 \\ 0 & 1 & 2 \\ 0 & 0 & -9 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & -1 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

(D 16)
$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

(C17) `kamisankaku(copymatrix(A));`

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & -3 & -6 \\ 7 & 8 & 0 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & -3 & -6 \\ 0 & -6 & -21 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & -3 & -6 \\ 0 & 0 & -9 \end{pmatrix}$$

(D 17) $\begin{pmatrix} 1 & 2 & 3 \\ 0 & -3 & -6 \\ 0 & 0 & -9 \end{pmatrix}$

(C18) `gyouretsushiki(copymatrix(A));`

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & -3 & -6 \\ 7 & 8 & 0 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & -3 & -6 \\ 0 & -6 & -21 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & -3 & -6 \\ 0 & 0 & -9 \end{pmatrix}$$

(D 18) 27

(C19) `myinv(copymatrix(A));`

$$\begin{pmatrix} 1 & 2 & 3 & 1 & 0 & 0 \\ 4 & 5 & 6 & 0 & 1 & 0 \\ 7 & 8 & 0 & 0 & 0 & 1 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 2 & 3 & 1 & 0 & 0 \\ 0 & -3 & -6 & -4 & 1 & 0 \\ 7 & 8 & 0 & 0 & 0 & 1 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 2 & 3 & 1 & 0 & 0 \\ 0 & -3 & -6 & -4 & 1 & 0 \\ 0 & -6 & -21 & -7 & 0 & 1 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 2 & 3 & 1 & 0 & 0 \\ 0 & 1 & 2 & \frac{4}{3} & -\frac{1}{3} & 0 \\ 0 & -6 & -21 & -7 & 0 & 1 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & -1 & -\frac{5}{3} & \frac{2}{3} & 0 \\ 0 & 1 & 2 & \frac{4}{3} & -\frac{1}{3} & 0 \\ 0 & -6 & -21 & -7 & 0 & 1 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & -1 & -\frac{5}{3} & \frac{2}{3} & 0 \\ 0 & 1 & 2 & \frac{4}{3} & -\frac{1}{3} & 0 \\ 0 & 0 & -9 & 1 & -2 & 1 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & -1 & -\frac{5}{3} & \frac{2}{3} & 0 \\ 0 & 1 & 2 & \frac{4}{3} & -\frac{1}{3} & 0 \\ 0 & 0 & 1 & -\frac{1}{9} & \frac{2}{9} & -\frac{1}{9} \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & 0 & -\frac{16}{9} & \frac{8}{9} & -\frac{1}{9} \\ 0 & 1 & 2 & \frac{4}{3} & -\frac{1}{3} & 0 \\ 0 & 0 & 1 & -\frac{1}{9} & \frac{2}{9} & -\frac{1}{9} \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & 0 & -\frac{16}{9} & \frac{8}{9} & -\frac{1}{9} \\ 0 & 1 & 0 & \frac{14}{9} & -\frac{2}{9} & \frac{2}{9} \\ 0 & 0 & 1 & -\frac{1}{9} & \frac{2}{9} & -\frac{1}{9} \end{pmatrix}$$

$$(D\ 19) \begin{pmatrix} -\frac{16}{9} & \frac{8}{9} & -\frac{1}{9} \\ \frac{14}{9} & -\frac{2}{9} & \frac{2}{9} \\ -\frac{1}{9} & \frac{2}{9} & -\frac{1}{9} \end{pmatrix}$$

(C22) `luresolution(copymatrix(A));`

$$(D\ 22) \left[\begin{pmatrix} 1 & 0 & 0 \\ 4 & 1 & 0 \\ 7 & 2 & 1 \end{pmatrix}, \begin{pmatrix} 1 & 2 & 3 \\ 0 & -3 & -6 \\ 0 & 0 & -9 \end{pmatrix} \right]$$

(C23) `L : lfctr(A);`

$$(D\ 23) \begin{pmatrix} 1 & 0 & 0 \\ 4 & 1 & 0 \\ 7 & 2 & 1 \end{pmatrix}$$

(C24) `U : ufctr(A);`

$$(D\ 24) \begin{pmatrix} 1 & 2 & 3 \\ 0 & -3 & -6 \\ 0 & 0 & -9 \end{pmatrix}$$

(C25) `L . U;`

$$(D\ 25) \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 0 \end{pmatrix}$$

(C26) B : matrix([1,2,3],[4,5,6],[7,8,9]);

$$(D\ 26) \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$$

(C27) kaidan(copymatrix(B));

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & -3 & -6 \\ 7 & 8 & 9 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & -3 & -6 \\ 0 & -6 & -12 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & 1 & 2 \\ 0 & -6 & -12 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & -1 \\ 0 & 1 & 2 \\ 0 & -6 & -12 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & -1 \\ 0 & 1 & 2 \\ 0 & 0 & 0 \end{pmatrix}$$

$$(D\ 27) \begin{pmatrix} 1 & 0 & -1 \\ 0 & 1 & 2 \\ 0 & 0 & 0 \end{pmatrix}$$

(C28) P : queryp(copymatrix(B));

$$\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix} \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & -3 & -6 \\ 7 & 8 & 9 \end{pmatrix} \begin{pmatrix} 1 & 0 & 0 \\ -4 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & -3 & -6 \\ 0 & -6 & -12 \end{pmatrix} \begin{pmatrix} 1 & 0 & 0 \\ -4 & 1 & 0 \\ -7 & 0 & 1 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 2 & 3 \\ 0 & 1 & 2 \\ 0 & -6 & -12 \end{pmatrix} \begin{pmatrix} 1 & 0 & 0 \\ \frac{4}{3} & -\frac{1}{3} & 0 \\ -7 & 0 & 1 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & -1 \\ 0 & 1 & 2 \\ 0 & -6 & -12 \end{pmatrix} \begin{pmatrix} -\frac{5}{3} & \frac{2}{3} & 0 \\ \frac{4}{3} & -\frac{1}{3} & 0 \\ -7 & 0 & 1 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & -1 \\ 0 & 1 & 2 \\ 0 & 0 & 0 \end{pmatrix} \begin{pmatrix} -\frac{5}{3} & \frac{2}{3} & 0 \\ \frac{4}{3} & -\frac{1}{3} & 0 \\ 1 & -2 & 1 \end{pmatrix}$$

$$(D\ 28) \begin{pmatrix} -\frac{5}{3} & \frac{2}{3} & 0 \\ \frac{4}{3} & -\frac{1}{3} & 0 \\ 1 & -2 & 1 \end{pmatrix}$$

(C29) P . B;

$$(D\ 29) \begin{pmatrix} 1 & 0 & -1 \\ 0 & 1 & 2 \\ 0 & 0 & 0 \end{pmatrix}$$

(C30) kill(ALL);

(D 0) DONE

(C1)