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[> restart:
> with(linalg):
Warning, the protected names norm and trace have been redefined and
unprotected

> A:=matrix([[1,sin(0),cos(0)],[1,sin(4*Pi/12),cos(4*Pi/12)],[1
,sin(8*Pi/12),cos(8*Pi/12)],[1,sin(12*Pi/12),cos(12*Pi/12)],[1
,sin(16*Pi/12),cos(16*Pi/12)],[1,sin(20*Pi/12),cos(20*Pi/12)
]]): B:=transpose(A): X:=matrix([[c],[a],[b]]):
Y:=matrix([[1.0],[1.6],[1.4],[0.6],[0.2],[0.8]]):

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> evalm(A)*evalm(X)=evalm(Y);
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$$\begin{bmatrix} 1 & 0 & 1 \\ 1 & \frac{1}{2}\sqrt{3} & \frac{1}{2} \\ 1 & \frac{1}{2}\sqrt{3} & -\frac{1}{2} \\ 1 & 0 & -1 \\ 1 & -\frac{1}{2}\sqrt{3} & -\frac{1}{2} \\ 1 & -\frac{1}{2}\sqrt{3} & \frac{1}{2} \end{bmatrix} \begin{bmatrix} c \\ a \\ b \end{bmatrix} = \begin{bmatrix} 1.0 \\ 1.6 \\ 1.4 \\ .6 \\ .2 \\ .8 \end{bmatrix}$$

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> evalm(B) * evalm(A) * evalm(X) = evalm(B) * evalm(Y);
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$$\begin{bmatrix} 1 & 1 & 1 & 1 & 1 & 1 \\ 0 & \frac{1}{2}\sqrt{3} & \frac{1}{2}\sqrt{3} & 0 & -\frac{1}{2}\sqrt{3} & -\frac{1}{2}\sqrt{3} \\ 1 & \frac{1}{2} & -\frac{1}{2} & -1 & \frac{1}{2} & \frac{1}{2} \end{bmatrix} \begin{bmatrix} 1 & 0 & 1 \\ 1 & \frac{1}{2}\sqrt{3} & \frac{1}{2} \\ 1 & \frac{1}{2}\sqrt{3} & -\frac{1}{2} \\ 1 & 0 & -1 \\ 1 & -\frac{1}{2}\sqrt{3} & -\frac{1}{2} \\ 1 & -\frac{1}{2}\sqrt{3} & \frac{1}{2} \end{bmatrix} \begin{bmatrix} c \\ a \\ b \end{bmatrix} =$$

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$$\left[ \begin{array}{cccccc} 1 & 1 & 1 & 1 & 1 & 1 \\ 0 & \frac{1}{2}\sqrt{3} & \frac{1}{2}\sqrt{3} & 0 & -\frac{1}{2}\sqrt{3} & -\frac{1}{2}\sqrt{3} \\ 1 & \frac{1}{2} & -\frac{1}{2} & -1 & \frac{-1}{2} & \frac{1}{2} \end{array} \right] \left[ \begin{array}{c} 1.0 \\ 1.6 \\ 1.4 \\ .6 \\ .2 \\ .8 \end{array} \right]$$

[> evalm(B&*A)*evalm(X) = evalm(B&*Y);

$$\left[ \begin{array}{ccc} 6 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 3 \end{array} \right] \left[ \begin{array}{c} c \\ a \\ b \end{array} \right] = \left[ \begin{array}{c} 5.6 \\ 1.0000000000\sqrt{3} \\ .8000000000 \end{array} \right]$$

[> solve({6*c = 5.6, 3*a = sqrt(3), 3*b = 0.8}, {c,a,b});
{c=.9333333333, a=.5773502692, b=.2666666667}
[> y=(14/15) + (sqrt(3)/3)*sin(2*Pi*t/12) +
(4/15)*cos(2*Pi*t/12);

$$y = \frac{14}{15} + \frac{1}{3}\sqrt{3} \sin\left(\frac{1}{6}\pi t\right) + \frac{4}{15} \cos\left(\frac{1}{6}\pi t\right)$$

[>

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