

OUTLINE for QM week 3

20 Jan 03

King quote - Milk day

questions on HW - #2, 6  
 quiz

Harmonic oscillator - review & continue  
 2.13 and setup 2.14 (worksheets from last week)

Start Cu 3

Cu 3 HW #9, 10, 18, 22, 23 (a, b, first part of c), 36 @

ANSWERS:

3.9 
$$\begin{pmatrix} 1 & 1 & 0 \\ 2 & 1 & 3 \\ 3i & (3-2i) & 4 \end{pmatrix} \begin{pmatrix} -3 & (1+3i) & 3i \\ (4+3i) & 9 & 6-2i \\ 6i & (6-2i) & 6 \end{pmatrix} \begin{pmatrix} 0 & 0 & 0 \\ 2 & 0 & 3 \\ 6+3i & -3i & 12 \end{pmatrix}$$

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

$T_r = 5$   $\det = 3$   $B^{-1} = \frac{1}{3} \begin{pmatrix} 2 & -3i & i \\ 0 & 3 & 0 \\ -i & -6 & 2 \end{pmatrix}$

3.10 
$$\begin{pmatrix} 3i \\ 6+2i \\ 6 \end{pmatrix} \quad -2-4i \quad 8+4i \quad \begin{pmatrix} 2i & (1+i) & 0 \\ 4i & (-2+2i) & 0 \\ 4 & (2+2i) & 0 \end{pmatrix}$$

3.18  $\lambda = 1$ ,  $a = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$       3.22:  $\lambda = -1, 2$ ,  $\bar{a} = \frac{1}{\sqrt{6}} \begin{pmatrix} i-1 \\ 2 \end{pmatrix}, \frac{1}{\sqrt{3}} \begin{pmatrix} 1-i \\ 1 \end{pmatrix}$

3.23  $\det = 0$ ,  $T_r = 6$   $\lambda = 0, 3, 3$   $a = \frac{1}{\sqrt{3}} \begin{pmatrix} 1 \\ i \\ -1 \end{pmatrix}, \frac{1}{\sqrt{2}} \begin{pmatrix} 1 \\ -i \\ 0 \end{pmatrix}, \frac{1}{\sqrt{6}} \begin{pmatrix} 1 \\ i \\ 2 \end{pmatrix}, S = \frac{1}{\sqrt{6}} \begin{pmatrix} \sqrt{2}-\sqrt{2}i & \sqrt{2} \\ \sqrt{3} & \sqrt{3}i & 0 \\ 1 & -i & 2 \end{pmatrix}$