Name: _____

PHYS2502 Mathematical Physics Quiz #9 31 Mar 2022

You have fifteen minutes to complete this quiz. You may use books, notes, or computers you have with you, but you may not communicate with anyone other than the instructor.

Write your solution on this page, plus the back if necessary, and additional sheets if absolutely necessary. You must show the steps of your solution.

Find the norm of the vector $\underline{u} = \underline{\underline{A}}\,\underline{v}$ where

$$\underline{\underline{A}} = \begin{bmatrix} 1 & 0 & i \\ -2 & i & 2 \\ 2 & -2 & 4 \end{bmatrix} \qquad \text{and} \qquad \underline{v} = \begin{bmatrix} 1 \\ 2 \\ 2 \end{bmatrix}$$

PHY2502 Mathematical Physics Quiz #9 Solution

Find the norm of the vector $\underline{u} = \underline{\underline{A}}\,\underline{v}$ where

$$\underline{\underline{A}} = \begin{bmatrix} 1 & 0 & i \\ -2 & i & 2 \\ 2 & -2 & 4 \end{bmatrix} \qquad \text{and} \qquad \underline{v} = \begin{bmatrix} 1 \\ 2 \\ 2 \end{bmatrix}$$

$$\underline{u} = \begin{bmatrix} 1 & 0 & i \\ -2 & i & 2 \\ 2 & -2 & 4 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ 2 \end{bmatrix} = \begin{bmatrix} 1+2i \\ -2+2i+4 \\ 2-4+8 \end{bmatrix} = \begin{bmatrix} 1+2i \\ 2+2i \\ 6 \end{bmatrix}$$

$$\langle u|u\rangle = (1-2i)(1+2i) + (2-2i)(2+2i) + 6\cdot 6 = 1+4+4+4+36 = 49$$

$$\sqrt{\langle u|u\rangle} = 7$$