1(c) (cont.)

$$\underline{A}^{-T}\begin{bmatrix} u \\ v \end{bmatrix} = \begin{bmatrix} uX + vX \\ -uX + vX \end{bmatrix} \quad \begin{bmatrix} uX - vX \\ uX + vX \end{bmatrix}$$

From the 2nd table, $\text{rect}(x,y) \overset{\mathcal{F}}{\longleftrightarrow} \frac{\sin \pi u}{\pi u} \frac{\sin \pi v}{\pi v}$

$\frac{\sin \pi(uX - vX)}{\pi(uX - vX)} \quad \frac{\sin \pi(uX + vX)}{\pi(uX + vX)}$

Using properties (i) & (v)

$$H_a(u,v) = k \frac{1}{(1/2X^2)} \frac{\sin \pi(uX + vX)}{\pi(uX + vX)} \frac{\sin \pi(-uX + vX)}{\pi(-uX + vX)}$$

$$= 2k \frac{\sin \pi(u+v)X \sin \pi(-u+v)X}{-u^2 + v^2} = \frac{2k \sin \pi(u+v)X \sin \pi(u-v)X}{u^2 - v^2}$$

(d) $H_a(0,0) = k 2X^2 = \underline{1}$ for a DC gain of 1.

$\therefore k = \frac{1}{2X^2}$