[ a) 
$$\begin{cases} var(X,) & cw(X, X_s) \\ E_{3X} = \\ cw(X_2, X_s) & var(X_s) & cw(X_s, X_s) \\ cw(X_3, X_s) & cw(X_3, X_s) & var(X_s) \end{cases}$$

Since covariance is symmetric.

$$\begin{cases} var(X_s, X_s) & var(X_s) \\ var(X_s) & var(X_s) \\ var(X_s) & var(X_s) \end{aligned}$$

Therefore, Exists symmetric and the shadower is false.

b) This shadower is false - if  $E_{3X}$  is singular, there is no joint pdf.

c)  $B_c \mid B_s \mid 1 \rightarrow N(1, 2-1)$ 

Therefore,

$$E[E_s \mid B_s \mid 1] = 1 \neq 2, \text{ so the shadowert is false}$$

d) One property of  $S_x(f)$  is that  $S_x(f) = S_x(f)$ 

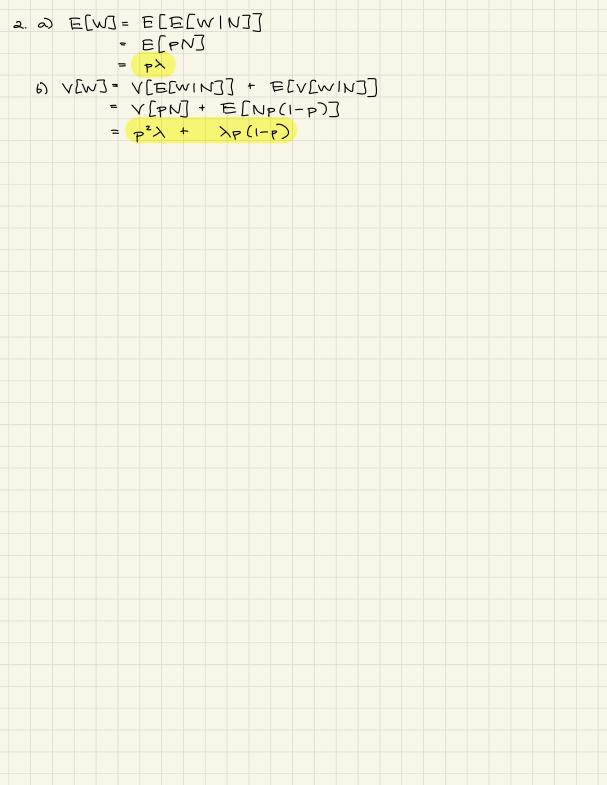
$$S_x(f) = 1 - f + sin(-f) \neq \{ + f + sin(f), so + this shadowert is false.$$
e) 
$$\begin{cases} var(N_1) & cw(N_1, N_2) & cw(N_1, N_3) \\ var(N_2, N_1) & var(N_2) & cw(N_1, N_3) \end{cases}$$

Since  $cw(N_2, N_1) = x + min(f_1, f_2) = min(f_1, f_2)$ 

and  $N_f \sim Poision(X_f) \Rightarrow Var(N_f) = X_f = f$ 

$$\begin{cases} 1 & 1 & 1 \\ 1 & 2 & 2 \\ 1 & 2 & 3 \end{cases}$$

Thus, the shadowert is five.



3. Let 
$$A = \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix}$$

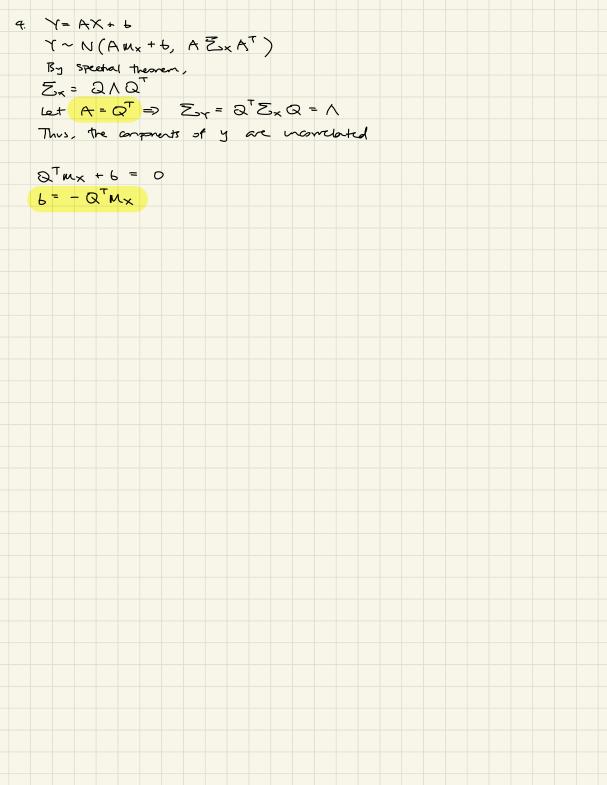
$$\begin{bmatrix} u \\ y \end{bmatrix} = A \begin{bmatrix} x \\ y \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = A^{-1} \begin{bmatrix} u \\ y \end{bmatrix}$$

$$g(u,v) = f(A^{-1} \begin{bmatrix} y \\ y \end{bmatrix})$$

$$\begin{bmatrix} A d + A \\ y \end{bmatrix}$$

$$= \begin{cases} f(\frac{u+x}{2}) \\ 2 \end{cases}$$



S. a) 
$$E[T] = E[Exp(2)] = \frac{1}{2}$$
 must  
b)  $R(N_{t+2} - N_{\xi} = 0) = \frac{-2(2)}{(2-2)^2} = \frac{-4}{2}$   
c)  $E[N_{5}, J] = 2(52) = 10^{4}$  retracts  
d) Let  $X = The number of verzes set of 52 weeks with at least 7 attracts
 $X_i = \text{matrocher}$  of if week i had at least 7 attractor  
 $X = \frac{1}{2} \times i$ , each  $X_i$  it independent  $P(X = 1) = 1 - P(X = 0)$   
 $= 1 - P(X_i = 0)^{2}$   
 $= 1 - P(X_i = 0)^{2}$   
 $= [-(1 - P(S_i < 1))^{52}$   
 $= [-(1 - P(I))^{52}$$ 

6. 
$$E_{X}(t_{1}, t_{2}) = E[Y_{t_{1}} Y_{t_{2}}]$$

$$= E[e^{St_{1}} e^{St_{2}}]$$

$$= E[e^{St_{1}} e^{St_{2}}]$$

$$= E[e^{2St_{1}} ] E[e^{St_{2}} - St_{2}]$$

$$= E[e^{2St_{1}} ] E[e^{St_{2}} - St_{2}]$$

$$= E[e^{2St_{1}} ] E[e^{St_{2}} - N(0, 1)]$$

$$= E[e^{2St_{1}} ] E[e^{St_{2}} - N(0, 1)]$$

$$= E[e^{2St_{2}} ] E[e^{St_{2}} - N(0, 1)]$$

$$= \exp(2St_{1}) \exp(\frac{1}{2}(t_{2} - t_{1}))$$

$$= \exp(2St_{1}) \exp(\frac{1}{2}(t_{2} - t_{1}))$$

$$= \exp(2St_{1}) \exp(\frac{1}{2}(t_{2} - t_{1}))$$

$$= \exp(2St_{2} - t_{1}) \exp(2St_{2} - t_{1})$$

$$= E[e^{2St_{2}} ] E[e^{St_{1}} - Et_{2}]$$

$$= E[e^{St_{1}} ] E[e^{St_{2}} - Et_{2}]$$

$$= E[e^{St_{1}} ] E[e^{St_{1}} - Et_{2}]$$

$$= E[e^{$$

$$= \int_{0}^{\infty} \int_$$

7. a) Mx(f) = E[X6] = E[X6(-1)N6]

= E[X.] E[(-)"+]

8. 
$$S_{X}(f) = e^{-f^{2}/2}$$

$$E[X_{t}^{-1}] = \int_{-\infty}^{\infty} e^{-f^{2}/2} df$$

$$= \sqrt{2\pi} \qquad (for calculater)$$

