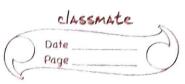
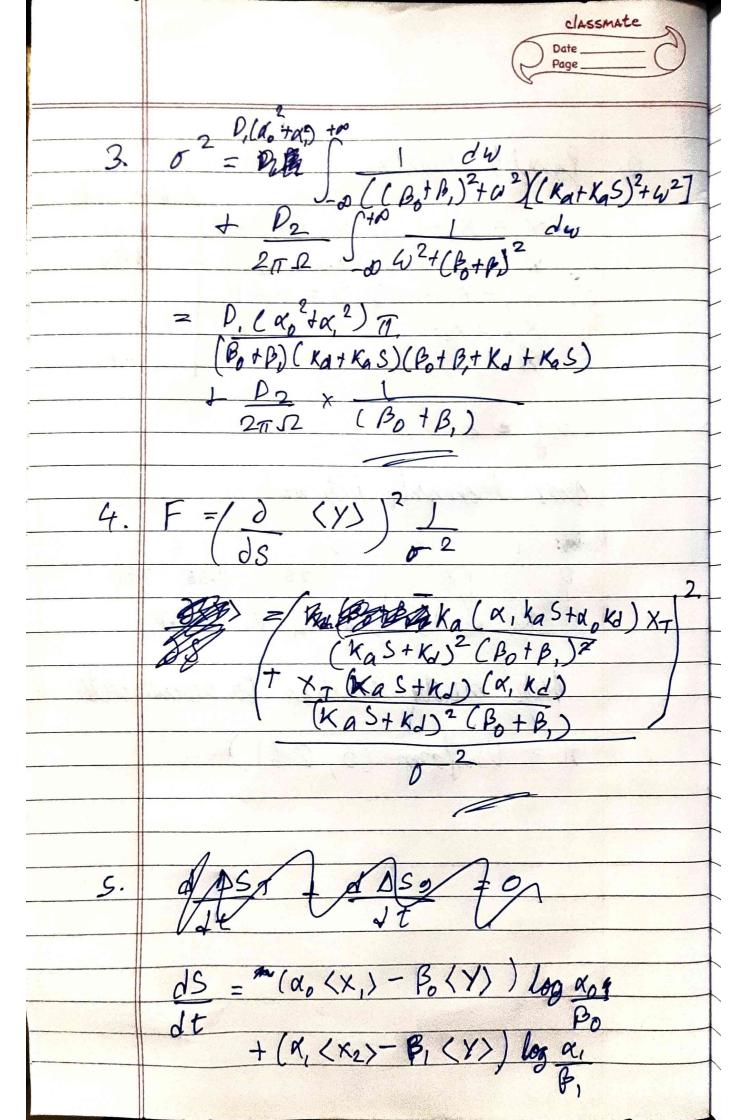
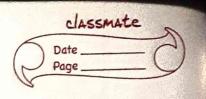
	Classma	te
0	Date	5
6	rage	

	Stock. processes - Take-home Gorge Rad
1.	$\frac{dX_1 = -KaSX_1 + K_1X_2 - 0}{dt}$
	$\frac{dx_2 = K_a S_{X_1} - K_a X_2}{dx_2} = 0$
	$\frac{dt}{dY} = K_0 X_1 + K_1 X_2 - \beta_0 Y - \beta_1 Y - 3$
	dt
	At steady state,
V.A.	160 Kasx, + KdxTA-kdx,
	$X_1 = X_d \times_T$ $K_d S + K_d$
1	$\overline{KaS+Kd}$ 3: $R_0O = \alpha_0X_1 + \alpha_1X_2 - \beta_0y - \beta_1Y$
	$\gamma = \alpha_0 \times_1 + \alpha_1 \times_2$
	$= \mathcal{K}_{B} K d X_{T} (\alpha_{o} + \kappa_{i})$
	(PotP.) (KaS+Kd)
2.	$dv = -(kS + k_1) \Lambda v_2 + \ln(t)$
•	$\frac{dx_2}{dt} = -(k_x^2 + k_y) \Delta x_2 + n_i(t)$
f	$\frac{dt}{\langle x_2 \rangle} = \frac{k_{aS}}{k_{aS+kd}} \times \frac{1}{k_{aS+kd}}$



(2,(t) n,(t')) - BS(t-t') x 2 KASKA X+
on Fourier Transforming, KaS+KJ 52
$\Delta x_2(\omega) = N_1(\omega)$
$S_{x_2}(\omega) = S_{x_1}(\omega)$
= 1 × 2 ka Skd × r Ka Cu ² + (Ka S + Kd) ² Ka S + Kd \ \(\sum_{\text{\subset}} \)
$d\Delta Y - \alpha \Delta x + \alpha \Delta x - \beta \Delta x - \beta \Delta x - \beta \Delta x$
$\frac{d\Delta Y}{dt} = \kappa_0 \Delta x_1 + \alpha_1 \Delta x_2 - \beta_0 \Delta y - \beta_1 \Delta y_2 \Delta y_3$ $\frac{dt}{dt} = \kappa_0 \Delta x_1 + \alpha_1 \Delta x_2 - \beta_0 \Delta y - \beta_1 \Delta y_2 \Delta y_3$ $\frac{dt}{dt} = \kappa_0 \Delta x_1 + \alpha_1 \Delta x_2 - \beta_0 \Delta y - \beta_1 \Delta y_2 \Delta y_3$ $\frac{dt}{dt} = \kappa_0 \Delta x_1 + \alpha_1 \Delta x_2 - \beta_0 \Delta y - \beta_1 \Delta y_2 \Delta y_3$ $\frac{dt}{dt} = \kappa_0 \Delta x_1 + \alpha_1 \Delta x_2 - \beta_0 \Delta y - \beta_1 \Delta y_2 \Delta y_3$ $\frac{dt}{dt} = \kappa_0 \Delta x_1 + \alpha_1 \Delta x_2 - \beta_0 \Delta y - \beta_1 \Delta y_2 \Delta y_3$ $\frac{dt}{dt} = \kappa_0 \Delta x_1 + \alpha_1 \Delta x_2 - \beta_0 \Delta y - \beta_1 \Delta y_2 \Delta y_3$
(Bo+B,) (RoS+Kd)
$(N_2(0) N_2(t)) = D_2 S(t-t')$
where $D_2 = \frac{32}{4}(\alpha, kas + a_0 kd)$ $\frac{1}{kas + kd}$
$D Y(\omega) = \alpha_0 Dx, (\omega) + \alpha_1 Dx_2(\omega) + n_2(\omega)$ $-1\omega + \beta_0 + \beta_1$
Soy(a) = Sox, (w) 102 + 2, 3 + 390 (w)
$S_0 Y(\omega) = S_{0x,(\omega)} \eta_0^2 + d_x^2 + \frac{3\eta_0(\omega)}{4\eta_0^2 + (\beta_0 + \beta_1)^2} \frac{1}{4\eta_0^2 + (\beta_0 + \beta_1)^2}$
[W3 + 1/20 + 9/16w + (Rast Ky) 27 27 [w2+(Pot P,)2]





d's at steady state = 0

 $0 = \mathcal{K}_0 \times_1 + \mathcal{K}_1 \times_2 - \beta_0 \times + \beta_1 \times$

de = (xo(x,) -Bo(x)) log do en

- (KO < X, > -BO (X)) log &,
B1

 $= \left(\alpha_0 \langle x, \rangle - \beta_0 \langle y \rangle \right) \left(\log \frac{\alpha_0}{\beta_0} - \log \frac{\alpha_1}{\beta_1} \right)$

= (RD (X1) - BD (Y2) log (XB)
BO K,

6. Python code to run the simulation in q.6 is attached within the Moodle submission