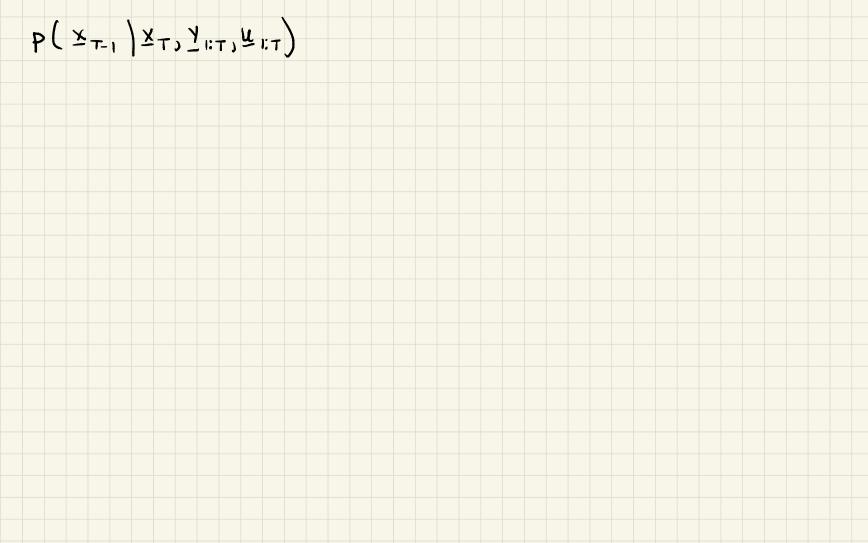
TAM 598 Lecture 20: State Space Models -Kalman Filters

Announcements:

- HW 5 covers lectures 17-20; due on Fri Apr 18

last time: × = 40 + Z0 initial conditions X++1 = A X+ B V+ 3+ transitions $y_{\cdot} = C \times + W_{\cdot}$ emissims Kalman Filter - recursively computes the posterior distribution P(xt | Y1:t, u1:t) using two steps: prediction step goal P(xt | Yitt-1) 41st) $= N\left(\times_{t-1} \middle| M_{t-1} \right) \bigvee_{t-1}$ P(Xt-1 | Y12t-1, U12t-1) say we have we use own update rules and marginalize over \$ 1.

goal: P(xx) 11:4, 11:4) update step we now condition one prior on a new measurement yet to obtain the posterior using Bayes Rule: SMOOTHING - now we want the posterior p(xt) Y := T, u := T) of the distribution of the state at t, given all measurements and control inputs up to some future time T.



from here:

(1) our joint distribution $P(X_T, X_{T-1} | Y_{1:T}, X_{1:T})$ is gaussian)

(2) integrate out X_T to get our smoothed distribution

3 Result is gaussian with mean

COYAMANIE