\[ 2^k = R^k \ (x^0, \ u^k) \]

And now we measure noise to states (System Model):

\[ x^k = f (x^{-1}, u^{-1}) \]

We may know how the system evolves.

But we can also observe \( x \).

We cannot "see" \( x \).

**Goal:** Estimate \( x \) - the current state of the system.

**Dynamic State Estimation**
The system model \( f(x) \) is a nonlinear function of the next state \( x_t \).

If we know \( P(x_t | x_{t-1}) \), maybe we can use it.

We assume that:

**Proposition:**

\[
P(x_t | z_t) = \int P(x_t | x_{t-1}) P(z_t | x_{t-1}) \, dx_{t-1}
\]

**Recursion Identity:** If we know \( P(x_t | x_{t-1}) \), then we know \( P(x_t | z_t) \), and hence the recursive Bayesian approach involves the following:

Estimate \( P(x_t | z_t) \) and use it for the non-linear part of the problem.

But this problem is non-linear.
\[
\frac{p(z_{1:t} | x_{1:T})}{p(x_{1:t})} = \frac{p(z_{1:t} | x_{1:T})}{p(z_{1:t})} \frac{p(x_{1:T} | z_{1:t})}{p(x_{1:T})}
\]

Update once \( x \) becomes available, else freeze.

Can we use the system model?

Maximize process of \( G \)
This PDF cannot be rendered by calculating analytically. And the factor that

\[
\int p(x_1, \ldots, x_n) \, dx_1 \ldots dx_n
\]

is a function of the previous parameters. The model of measurement is

\[
p(x_1 | x_2, \ldots, x_n) = \frac{p(x_1, x_2, \ldots, x_n)}{p(x_2, \ldots, x_n)}
\]

Previous PPF

Previous Model

Update (1)
Given \( \mathcal{N}(m, \xi) \) and \( \mathcal{N}(m', \xi') \)

To be assumed

What is:

AND THE PDF'S ARE GAUSSIAN?

WHAT IF \( f(x) \) \& \( f(x') \) ARE LINEAR

| ALMAN FLETCHER |
\[ S = \frac{1}{2} p \left( \frac{1}{2} k \right) + \frac{1}{2} \]

\[ k = \frac{1}{(2)^{l-1}} \cdot \frac{1}{S-1} \]

\[ p_{l+1} = p_{l} - k \cdot p_{l-1} \]

\[ m_{l+1} = m_{l} + k \cdot (z_{l+1} - z_{l}) \]

\[ m_{l}|_{k=0} = m_{l-1} + \int_{p_{l+k}}^{p_{l}} \]

\[ P_{l+1} = 0 + \int_{p_{l}}^{p_{l+k}} \]

(1st Law: Force = Mass * Acceleration)

(2nd Law: Force = Mass * Acceleration)

(3rd Law: For every action, there is an equal and opposite reaction)
Let or Minge:\n\[ \text{let or Minge} \]

Samoe as before, except that:

Samoe as before, except that:

Where linear?

Where linear?

What \( f(0) \) and \( f'(0) \) not linear.

\[ f \]