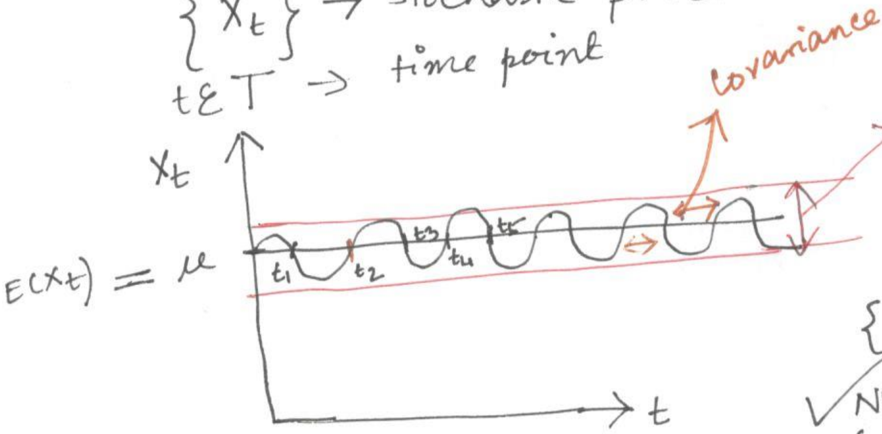
Example of moment stationarity via pictorial diagrams

$\{X_t\} \rightarrow$ stochastic process

$t \in T \rightarrow$ time point



✓ Mean line does not change its direction, it is actually constant.

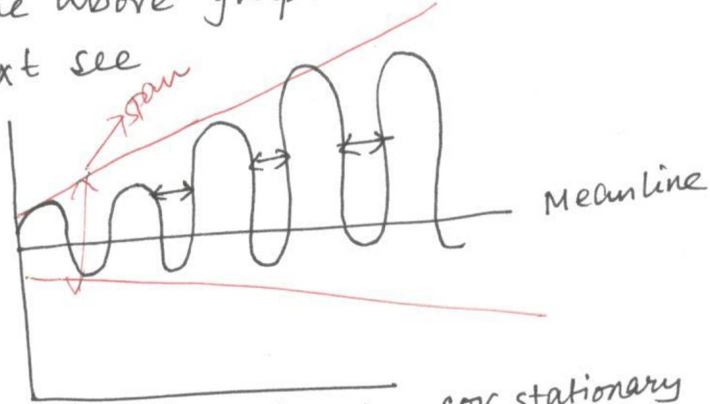
$\{X_t\}$ Mean stationary

✓ Next look at span of the ~~se~~ graph (red line) → this span gives the idea of variance. span remains same. So $\{X_t\}$ variance stationary.

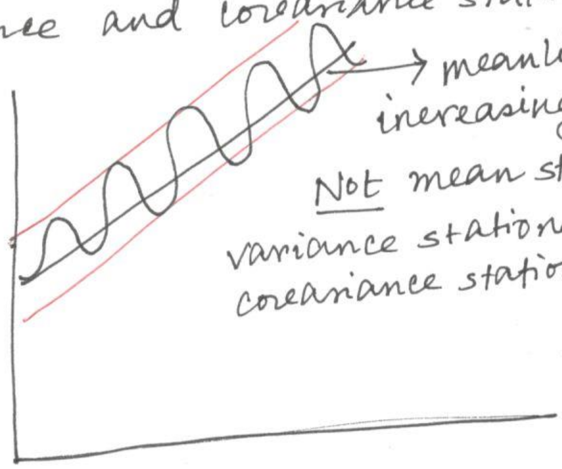
✓ Next look at distance between any two humps. The distance remains same for any two humps. It gives the association between ~~two~~ ~~variables~~ X_t at two different time points. If the distance same the process is covariance stationary.

The above graph is mean, variance and covariance stationary.

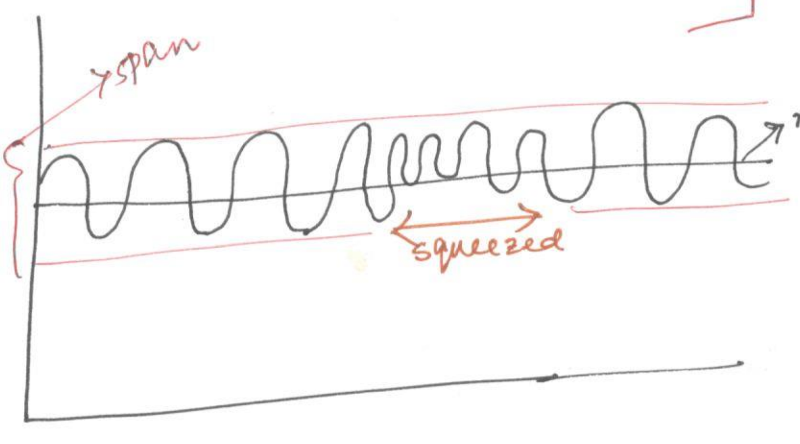
Next see



Mean stationary; cov. stationary but not variance stationary.
[look at the span (red line]



Not mean stationary
variance stationary
covariance stationary



meanline constant. → $\boxed{\text{Mean stationary}}$

span ~~x~~ is constant

↓

$\boxed{\text{variance stationary}}$

Distance between two humps varying

↓ $\boxed{\text{covariance nonstationary}}$