If $\begin{pmatrix} X \\ Y \end{pmatrix} \sim N(m(t), \Sigma(t))$

and $m(t), \Sigma(t)$ are cts in t,

then $\mathbb{E}[|X(t)|\,|Y(t)|]$ is continuous (and so bounded on a compact set)

$\mathbb{E}X^a$

$\leq \mathbb{E}[\cancel{X^2(t)Y^2(t)}]$ $\mathbb{E}[X(t)^2]\,\mathbb{E}[Y(t)^2]$

$X_i \sim N(m_i(t), \sigma_i^2(t))$

$\boxed{\text{If}}$ $\cancel{\begin{pmatrix} X_1 \\ \vdots \\ X_D \end{pmatrix} \sim N(m(t), \Sigma(t))}$ and m, σ cts $\forall i$

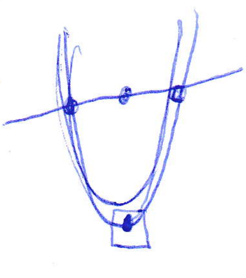
Then $\mathbb{E}\left[\prod |X_i|\right]$ is **bounded** on a compact set

Proof: D even, then

$$\mathbb{E}\left[\prod |X_i|^k\right] \leq \prod \mathbb{E}[|X_i|^D]^{1/D} = \prod \mathbb{E}[X_i^D]^{1/D}.$$

should be a cts f^n of the m_i, σ_i!
so a cts f^n of t.

can make a similar argument if D is odd. □



$f(\mathbb{E}) \leq \mathbb{E}(f)$