$$P_{\nabla Y(t) \mid \sup_t \nabla^3 Y(t)}(x \mid y)$$

x $\quad$ y

$P_{X|Y}(x|y)$ is continuous in x (about $x=0$)

y fixed.

$P_{Y|X}(y|x)\, P_X(x)$ → continuous in x as X Gaussian

$P_Y(y)$ → constant

$$\nabla^3 Y(s) = \Sigma_1^*(s)\nabla Y(t) + Z(s)$$

independent of $\nabla Y(t)$

$$\nabla^3 Y(s) \mid \nabla Y(t) \sim N\left(\Sigma_1^*(s)\nabla Y(t),\ \Sigma_2^*(s)\right)$$

this has a density ctr in $\nabla Y(t)$

$\sup_t (a(t)x + z(t))$

$P_{Y(y)}(x)$ is ctr in x! need to show not ctr in t

so if $\mu(t)x + z(t) = y(t)$ (fixed f^n. value.)