2

$= \cancel{\lim_{r\to 0} \mathbb{P}}$

So

① num / denom $=$

$$\lim_{r \to 0} \mathbb{P}\left(\sup_{t \in B_0(h)} \left| Y(t/\sqrt{Y(0)}) - Y(0) - \frac{t^T \nabla Y(0)}{\sqrt{Y(0)}} - \frac{1}{2} t^T \frac{\nabla^2 Y(0)}{Y(0)} t \right| > \eta/3 \right.$$

$$\left. \mathcal{M}(B_r(0)), Y(0) > v \right) \quad (*)$$

$$\mathbb{P}(\mathcal{M}(B_r(t_0)), Y(0) > v)$$

On the event $Y(0) > v$, $t/\sqrt{Y(0)} \leq t/\sqrt{v}$.

as such

$$\sup_{t \in B_0(h)} \left| Y(t/\sqrt{Y(0)}) - Y(0) - \frac{t^T \nabla Y(0)}{Y(0)} - \frac{1}{2} t^T \frac{\nabla^2 Y(0)}{Y(0)} t \right|$$

$$\leq \sup_{t \in B_0(h)} \left| Y(t/\sqrt{v}) - Y(0) - t^T \frac{\nabla Y(0)}{\sqrt{v}} - \frac{1}{2} t^T \frac{\nabla^2 Y(0)}{v} t \right|$$

$\Rightarrow (*)$

$$\leq \mathbb{P}\left(\sup_{t \in B_0(h)} \left| Y(t/\sqrt{v}) - Y(0) - t^T \frac{\nabla Y(0)}{\sqrt{v}} - \frac{1}{2} t^T \frac{\nabla^2 Y(0)}{v} t \right| > \eta/3 \cap \mathcal{M}(B_r(t_0)), Y(0) > v \right)$$