Section 9

Fix h   Next step: write out IKR inequality

①

Idea:

$$\sup_{t \in B(h)} \left| X(t/\sqrt{X(0)}) - X(0) - \cancel{\tfrac{1}{2} t \nabla t} \; \tfrac{1}{2} t^T \frac{\nabla^2 X}{X(0)} t \right|$$

and generalise as in Prop 2.1

an indicator for term $\boxed{\frac{\nabla^2 X(0)}{X(0)} \leq \frac{\nabla^2 X(0)}{v}}$

drag as $\left|\frac{X(0)}{v}\right| \to 1$ as $v \to \infty$?

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

since $X(0) \geq v$.

~~not sure~~ +/- ~~need~~ 2 replace here!

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so $\mathbb{P}(\sup(u) > \varepsilon) \leq \mathbb{P}(\sup(v) > \varepsilon)$!

hurray!

so may as well use v for ease
cas don't have to worry about distributional issues for $t/\sqrt{X(0)}$

Now,

$\sup_{t \in B(h)} |f|$ is cts and $\forall v$,

$$X(t/\sqrt{v}) - X(0) - \tfrac{1}{2} t^T \frac{\nabla^2 X(0)}{v} t$$

$$=_d \; \varepsilon(t/\sqrt{v}) + K(t/\sqrt{v})$$

$\Downarrow$