Fix $h > 0$, Then want to show that

$$\mathbb{P}\left(\sup_{t \in B_{t_0}(h)} \left| \cancel{Y(t_0+t)} \ldots Y(t) \ldots Y(t_0) \right| \right)$$

$20:20:200$	bootstrap
	non-bootstrap

Wlog $t_0 = 0$, want to show that:

$$(*) \; \mathbb{P}\left(\sup_{t \in B_h(0)} \left| Y(t/\sqrt{Y(0)}) - Y(0) + \tfrac{1}{2} t^T \Lambda t \right| > \eta \;\middle|\; \mathcal{M}_v(0) \right)$$

$$\longrightarrow 0 \text{ as } v \nearrow \infty \ldots$$

Proof:

$$(*) \le \mathbb{P}\left(\sup_{t \in B_h(0)} \left| Y(t/\sqrt{Y(0)}) - Y(0) - t^T \frac{\nabla Y(0)}{\sqrt{Y(0)}} - \frac{1}{2} t^T \frac{\nabla^2 Y(0)}{Y(0)} t \right| > \eta/3 \;\middle|\; \mathcal{M}_v(0) \right) \quad (1)$$

$$+ \mathbb{P}\left(\sup_{t \in B_h(0)} \left| t^T \frac{\nabla Y(0)}{\sqrt{Y(0)}} \right| > \eta/3 \;\middle|\; \mathcal{M}_v(0) \right) \quad (2)$$

$$+ \mathbb{P}\left(\sup_{t \in B_h(0)} \left| \tfrac{1}{2} t^T \Lambda t - \tfrac{1}{2} t^T \frac{\nabla^2 Y(0)}{Y(0)} t \right| > \eta/3 \;\middle|\; \mathcal{M}_v(0) \right) \quad (3)$$

$$\longrightarrow 0 \, !$$