$$\mathbb{E}\left[\|b_k\left(2u^{-1/2}p + 2H \right.\right.$$

$$\mathbb{E}\left[\left(2u^{-1/2}p_{\ddot{y}} + 2H_{\ddot{y}} \right)^k \mathbb{1}\left[\|2H\| > v^{1/2}u/2 \right]\right]$$

consider

$$\mathbb{1}\left[\|2H\| > v^{1/2}u/2 \right]$$

$$= \mathbb{1}\left[\|2H\| > v^{1/2}u/2, \ |2H_{\ddot{y}}| > v^{1/2}u\alpha \right]$$

$$+ \mathbb{1}\left[\|2H\| > v^{1/2}u/2, \ |2H_{\ddot{y}}| < v^{1/2}\alpha \right]$$