Problem Set 5.

Oct 30,2000

Let $h \geq 0$ be given. Consider a Markov chain on $R$, with transition probability density

$$\pi_h(x,y) = \frac{1}{\sqrt{2\pi h}} exp[-\frac{1}{2h}(y - x - hb(x))^2]$$

What is the Radon Nikodym derivative of this Markov chain with respect to the random walk with transition densities

$$q_h(x,y) = \frac{1}{\sqrt{2\pi h}} exp[-\frac{1}{2h}(y - x)^2]?$$

If we think of $X_n$ as $X_h(nh)$ for a continuos time process $X_h(t)$ sampled at $t = nh$ and linearly interpolated in between, what happens as $h \to 0$ to the random walk with transition probability $q_h$, to the chain with transition probability $\pi_h$ and to the Radon-Nikodym derivative?