Problems 6:
Stochastic differential equations and integrals

Roman Belavkin

Middlesex University

Question 1

Is the process $x(t)$, described by a stochastic differential equation $dx(t) = x(t)[\mu\, dt + \sigma\, dw(t)]$, differentiable at any t? Is the process $y(t) = \ln(x(t))$ differentiable?

Question 2

Consider the following stochastic differential equations:

a) $dx = \mu\, dt + \sigma\, dw$

b) $dx = \mu x\, dt + \sigma\, dw$

c) $dx = x(\mu\, dt + \sigma\, dw)$

d) $dx = \sin(x)\, dt + \cos(x)\, dw$

What are the drift $f(x,t)$ and diffusion $g(x,t)$ parts in each of these equations?