

1. Suppose X and Y evolve according to

$$dX_t = (2 + 5t + X_t)dt + 3dz_{1t}$$

$$dY_t = 4Y_tdt + 8Y_tdz_{1t} + 6dz_{2t},$$

where z_{1t} and z_{2t} are Brownian motions with $(dz_{1t})(dz_{2t}) = 0.1dt$. Determine the dynamics (SDE) of

a) X_t^4

b) e^{X_t}

c) X_tY_t

d) $X_t^4Y_t$