

**MFM 5022:
HOMEWORK #10**

Question 0.1:

See #2 on the sample final.

Question 0.2:

See #4 on the sample final.

Question 0.3:

a) Heath-Jarrow-Morton equations is given by

$$df(t, T) = \sum_{i=1}^{\nu} \frac{\partial \sigma_i(t, T)}{\partial T} dW_t^i + \left(\sum_{i=1}^{\nu} \frac{\partial \sigma_i(t, T)}{\partial T} \int_t^T \frac{\partial \sigma_i(t, s)}{\partial s} ds \right) dt.$$

In case $\nu = 1$ and $\frac{\partial \sigma(t, T)}{\partial T} = \sigma f(t, T)$, we have

$$df(t, T) = \sigma f(t, T) dW_t + \left(\sigma f(t, T) \int_t^T \sigma f(t, s) ds \right) dt.$$

b). For a different equation $f'(t) = f^2(t)$, by separating the variables, we can find $f(t) = \frac{1}{c-t}$ for some c . and it blows up as t approaching c .
