

These are the formula that I used to calculate the values of X\_t\_d and dX\_t\_d/dsigma

In part a) I have a list called Costs which contains the possible values of X on t\_e

Next we step by step backtrack on Cost list until it contains only one element which is the value of X\_t\_d

In part b) I do the exact same steps as in price\_xyz but I have a new list called differentiations.

Initially differentiations has the following value for each leaf node:

{dA\_t\_e/dsigma if A\_t\_e > B

{0 otherwise

A\_t\_e = A\_t\_d \* e^(i\*sigma\*∆t), So calculating the values of differentiations is pretty straight forward.

Next we calculate dp\_d/dsigma and dp\_u/dsigma which is a little tedious to calculate but easy to execute.

Now we again just backtrack on the two lists till only one value is left in differentiations