**MA 374 - Financial Engineering Lab07**

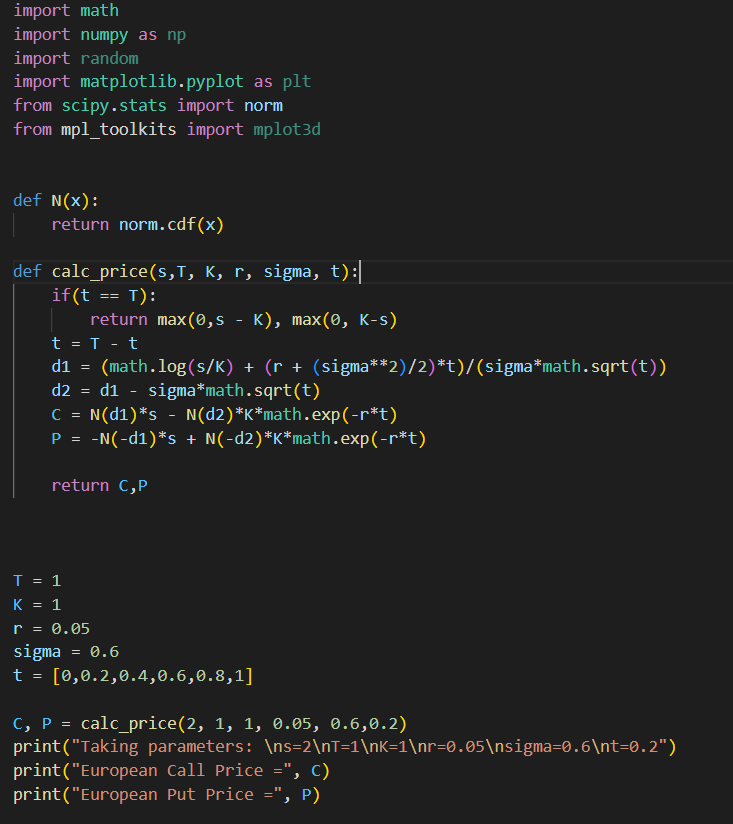
**Sahil Kumar Gupta**

**200123081**

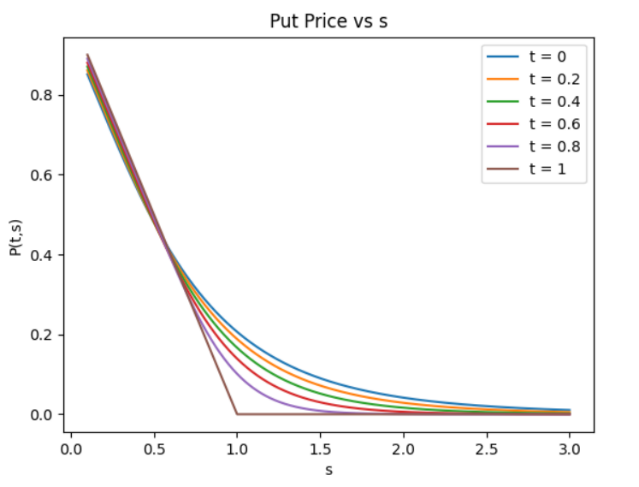
**Q1**

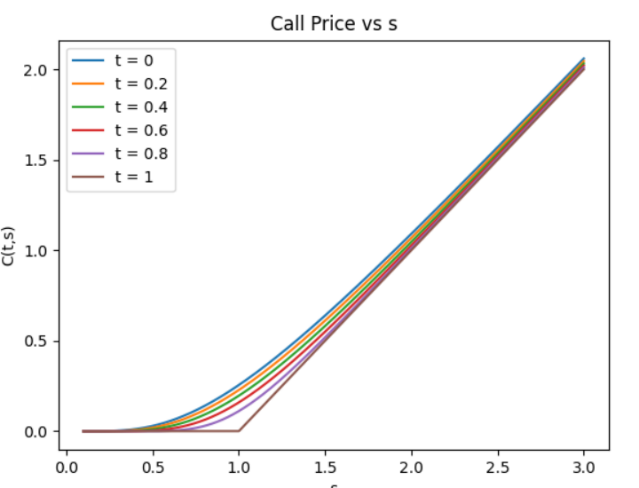
Formula used for calculating the Put and Call option price in the classical BSM framework using Black-Scholes-Merton PDE is:

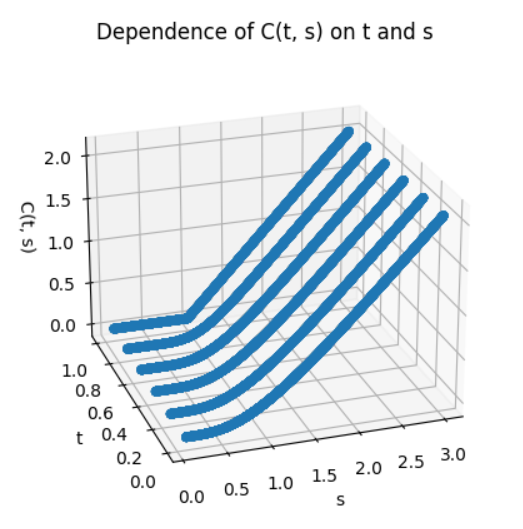
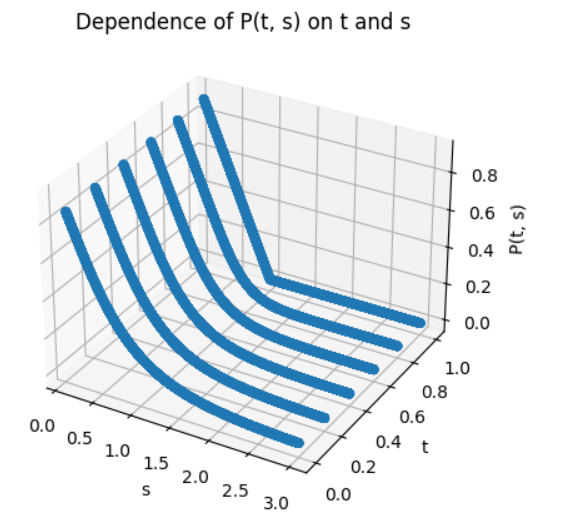
where,

Function written to compute the required prices in this question is:

**Q2**

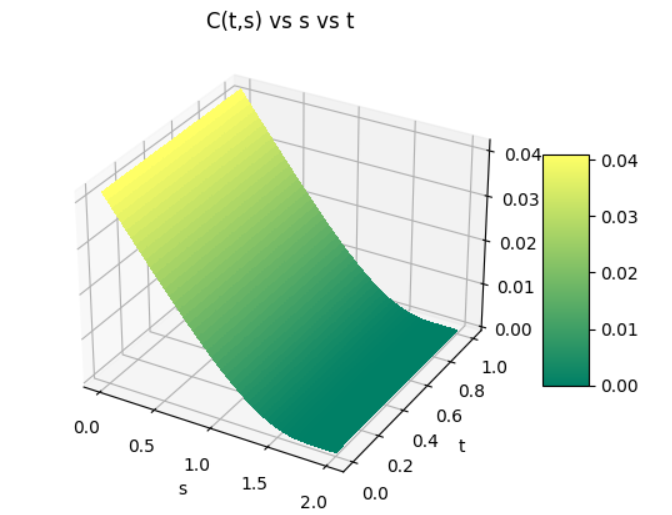
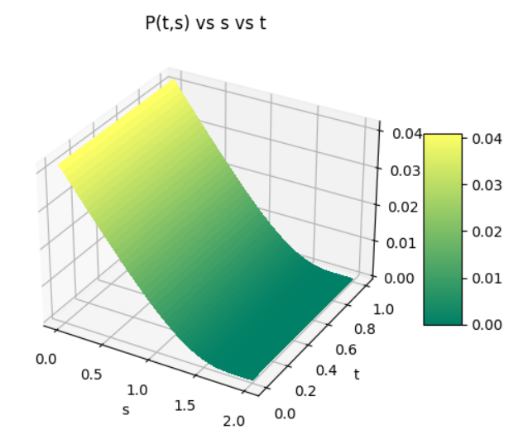
Using the given values of the parameters as given in the question and the function written in previous question, plot of C(t,s) and P(t,s) as a function of *s* for different values of *t* is obtained s:



Showing the same information in 3-dimensional form:

**Q3**

Required plots of C(t,s) and P(t,s) as smooth surface above the (t,s)-plane:

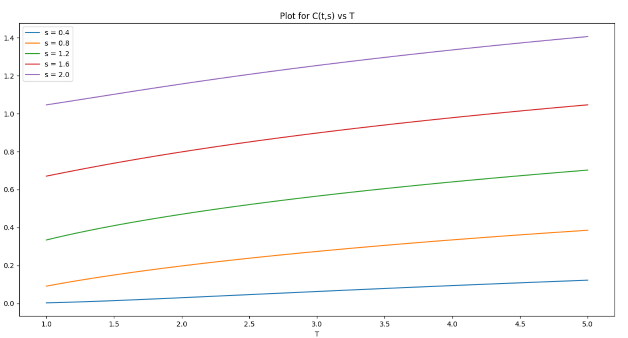
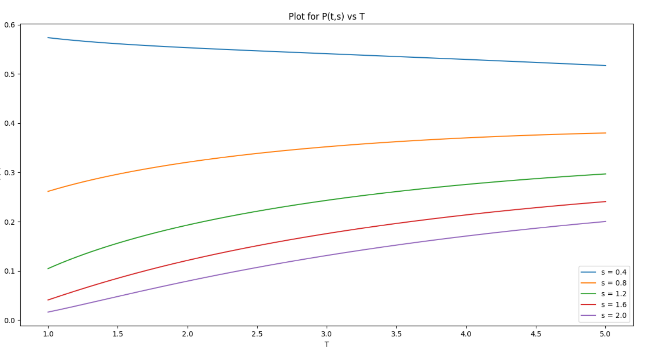
The parameter values are adjusted as needed, and when specific parameter values are needed, they are obtained as:

**Q4**

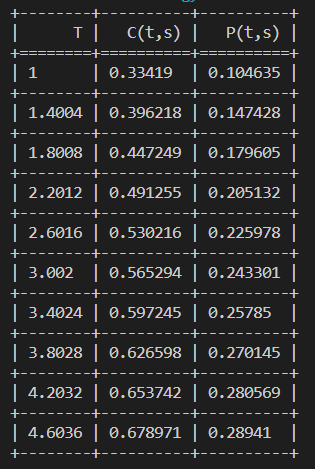
The parameter values are adjusted as needed, and when specific parameter values are needed, they are obtained as:

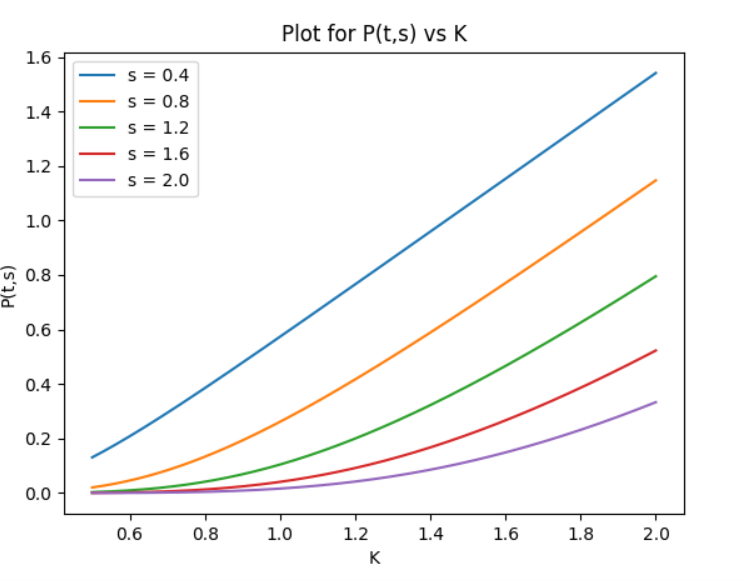
**Variation of C(t,s) and P(t,s) with Stock Price (s):**

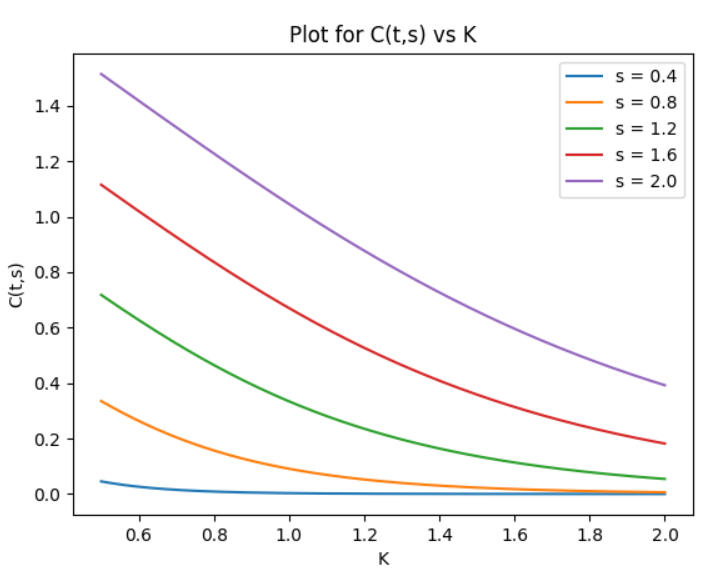
This is case is already covered in Q2 and Q3

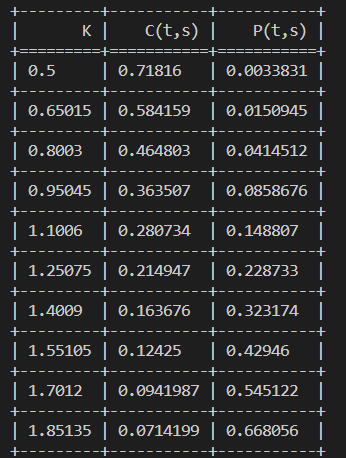
**Variation of C(t,s) and P(t,s) with Expiration Time (T):**

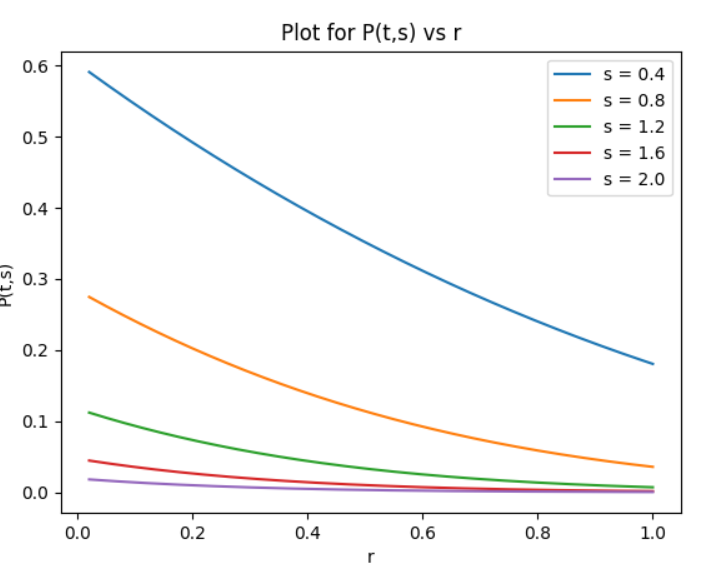
Some of the values are: (with parameters as and )

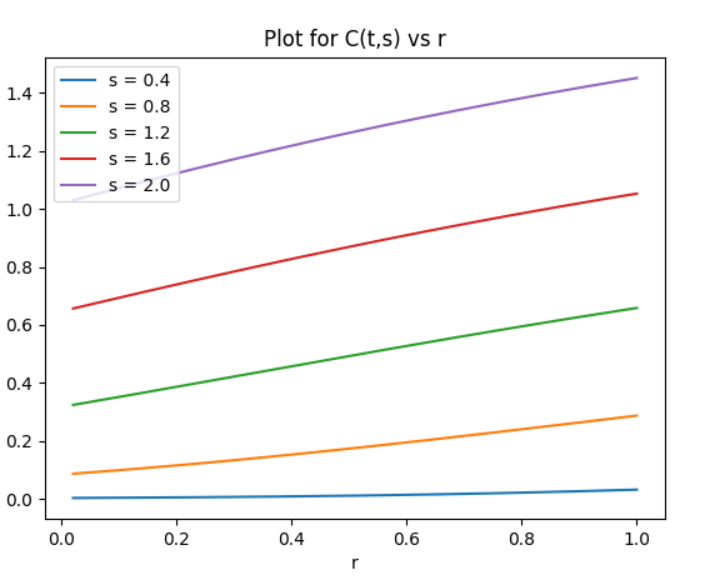
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**Variation of C(t,s) and P(t,s) with Strike Price (K):**

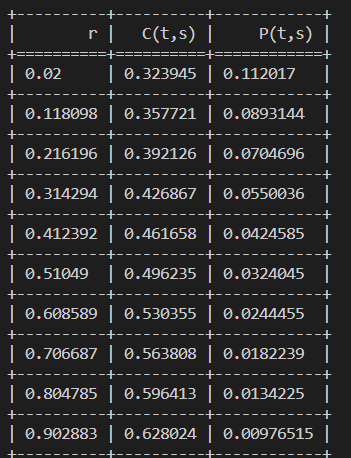
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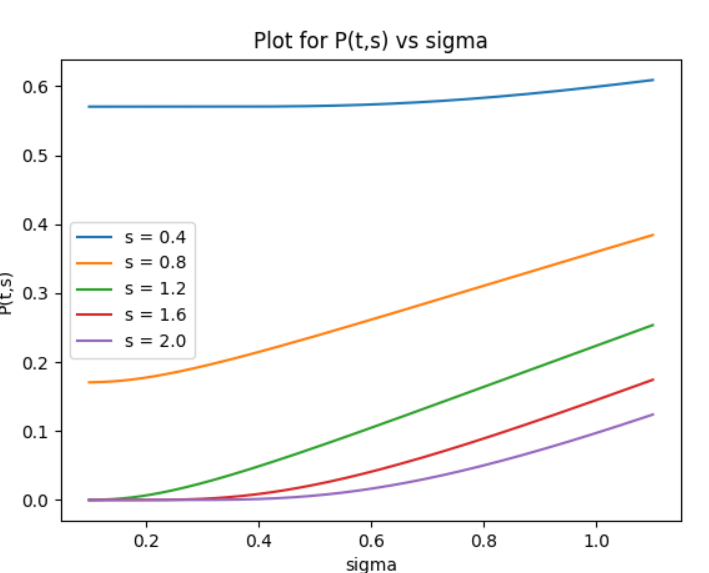
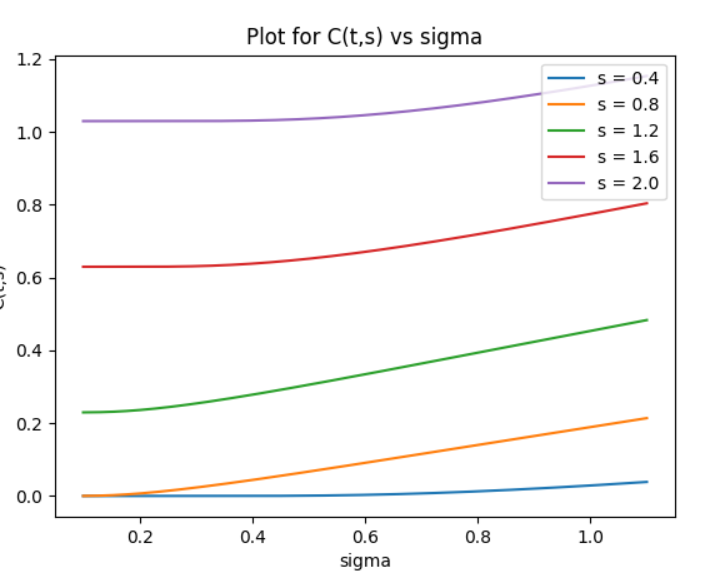
****Some of the values are: (with parameters as and )

**Variation of C(t,s) and P(t,s) with Rate of Interest (r):**

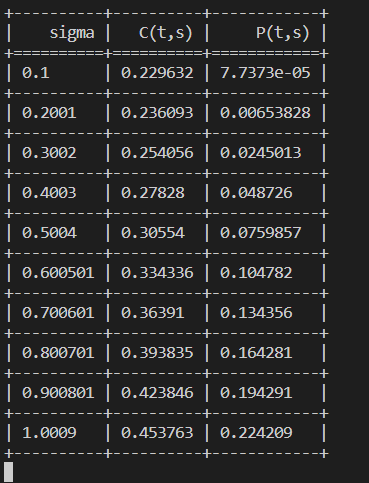
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Some of the values are: (with parameters as and )

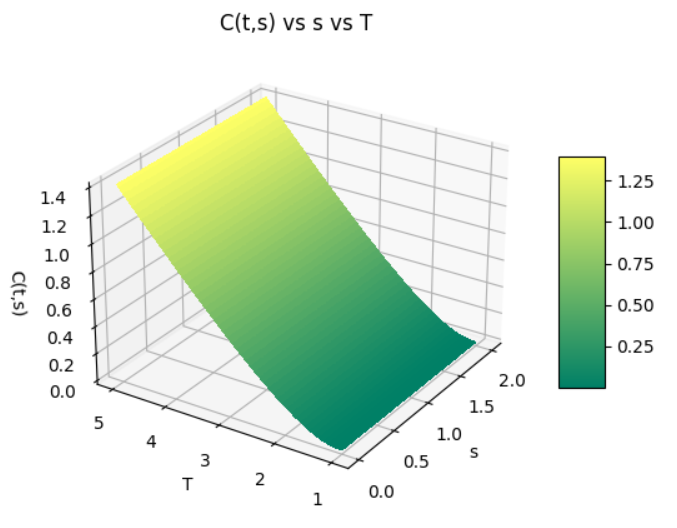
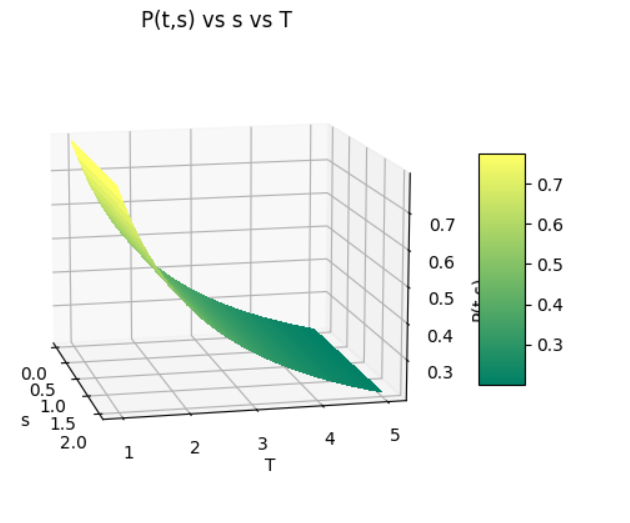
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**Variation of C(t,s) and P(t,s) with Volatility (sigma):**

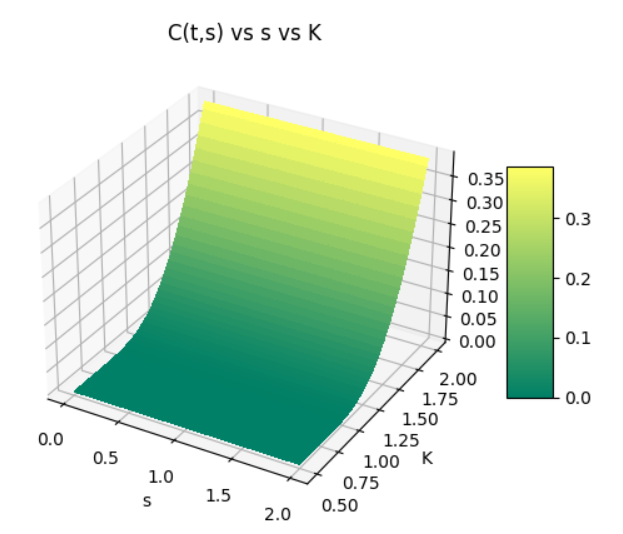
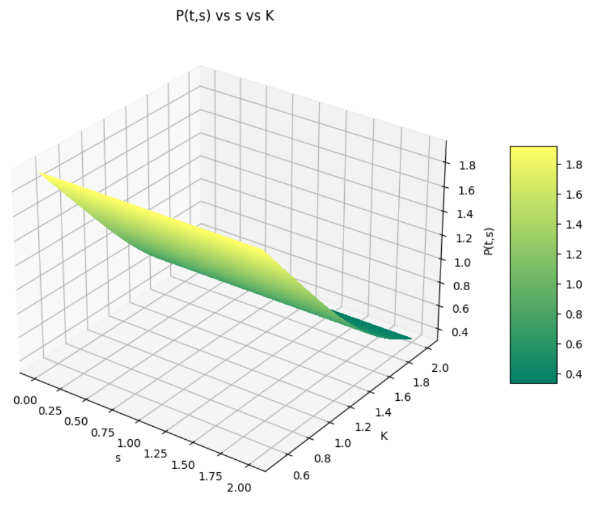
Some of the values are: (with parameters as and )

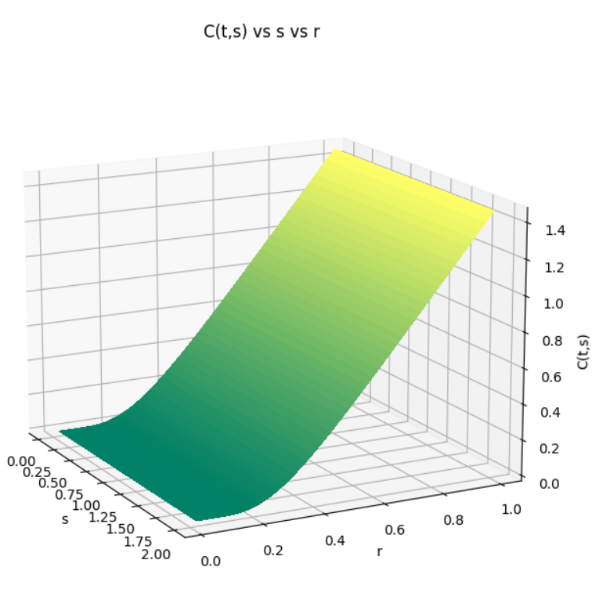
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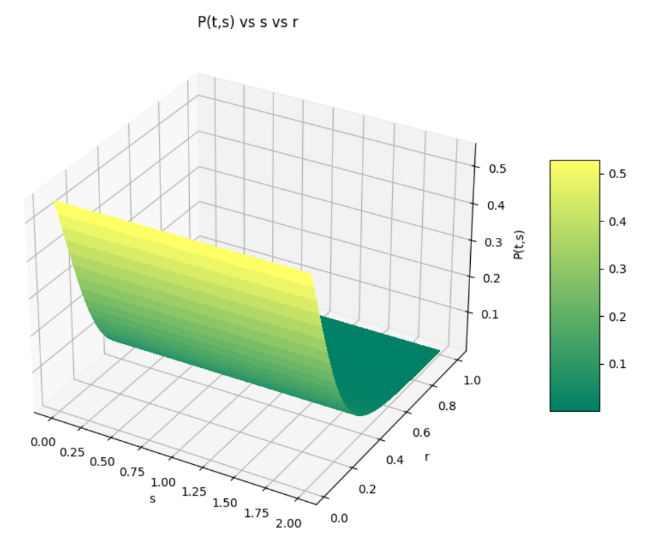
**Variation of C(t,s) and P(t,s) with Stock Price (s) and Expiration Time (T):**

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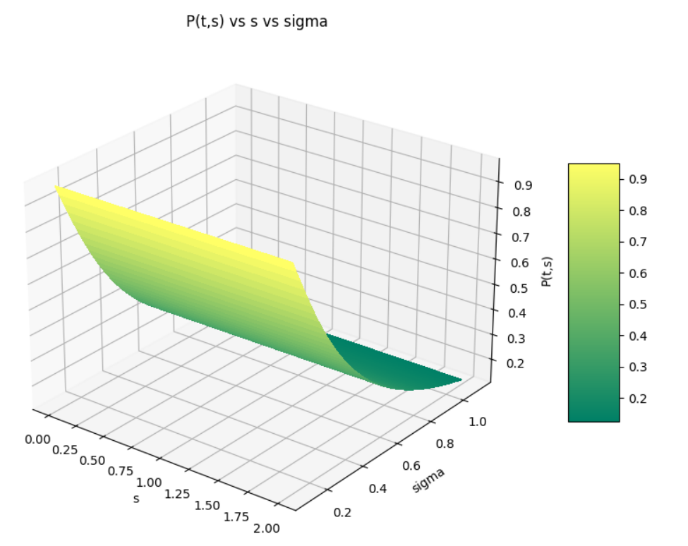
**Variation of C(t,s) and P(t,s) with Stock Price (s) and Strike Price (K):**

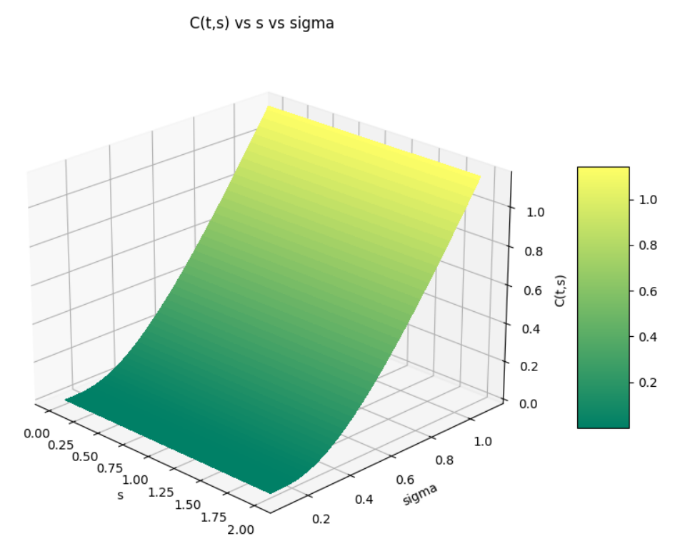


**Variation of C(t,s) and P(t,s) with Stock Price (s) and Rate of Interest (r):**

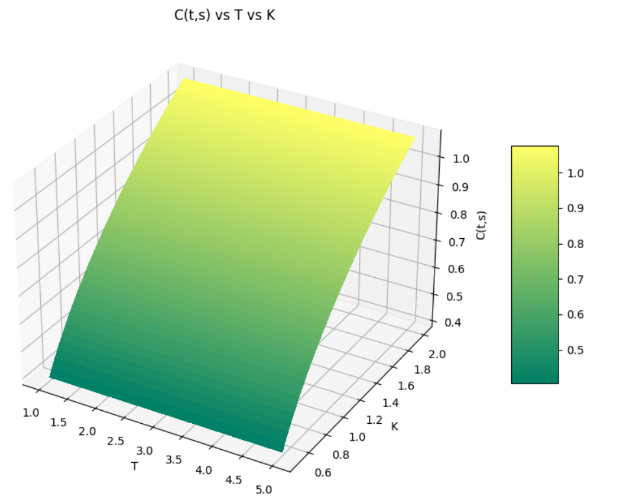
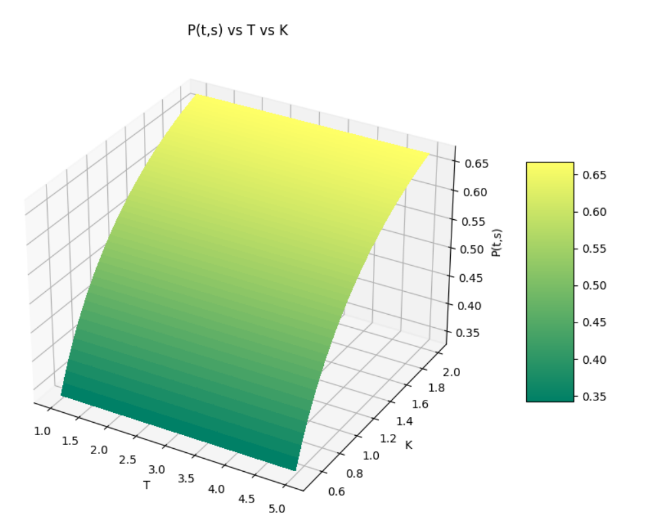


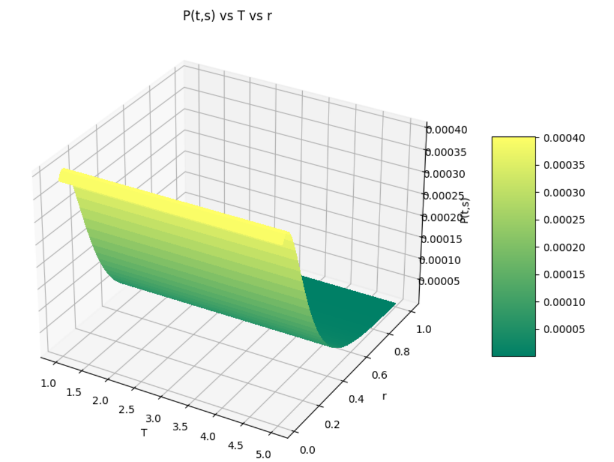
**Variation of C(t,s) and P(t,s) with Stock Price (s) and Volatility (sigma):**

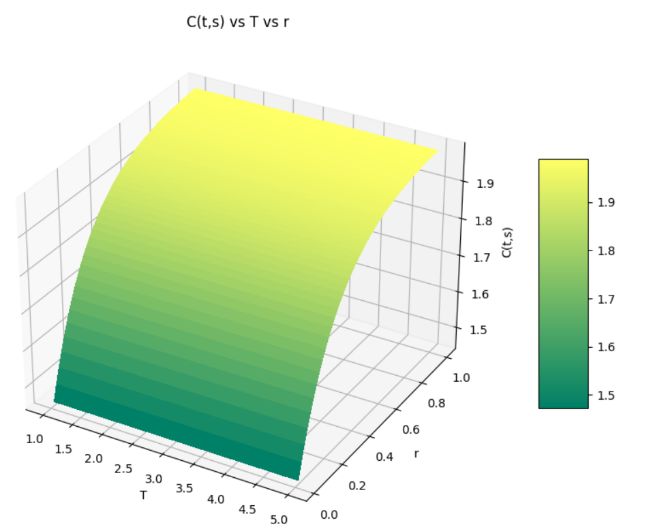


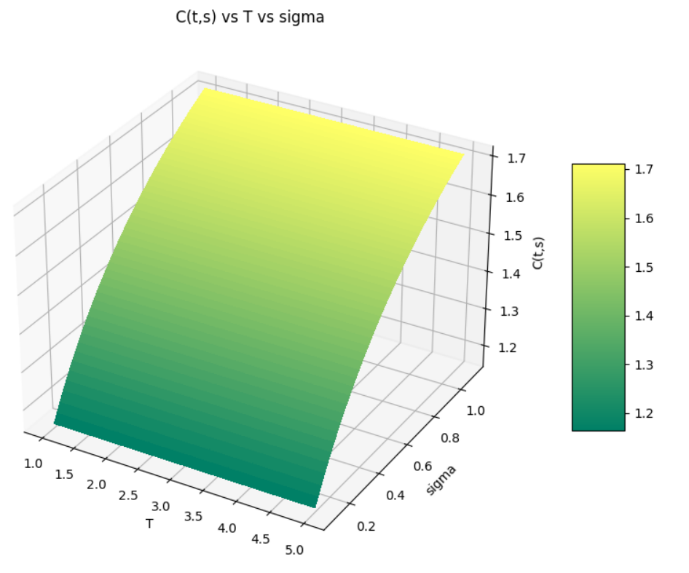
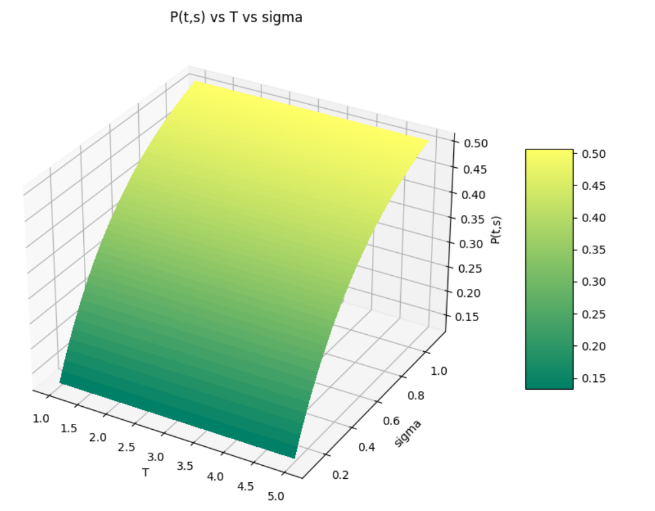


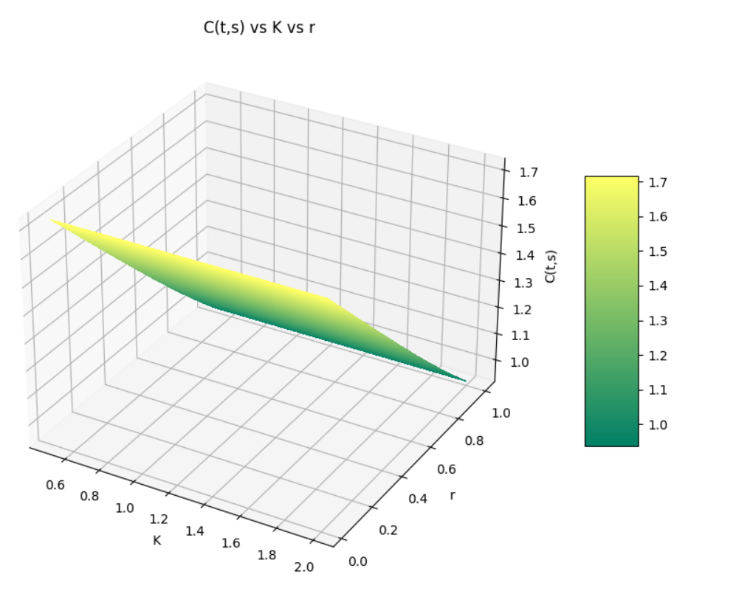
**Variation of C(t,s) and P(t,s) with Expiry Time (T) and Strike Price (K):**

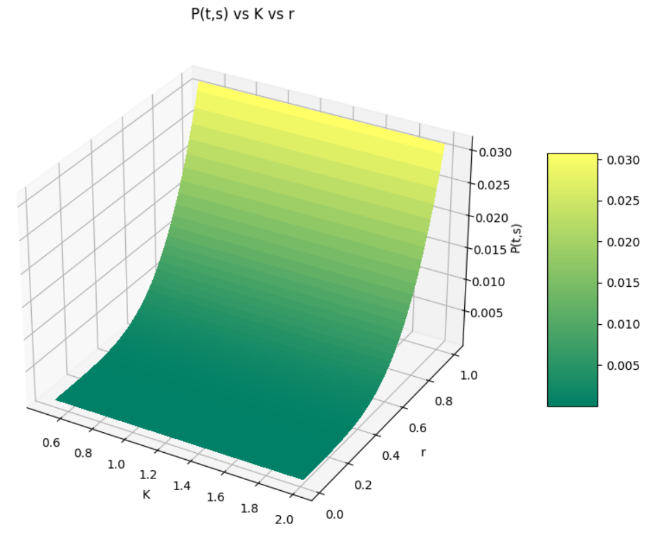


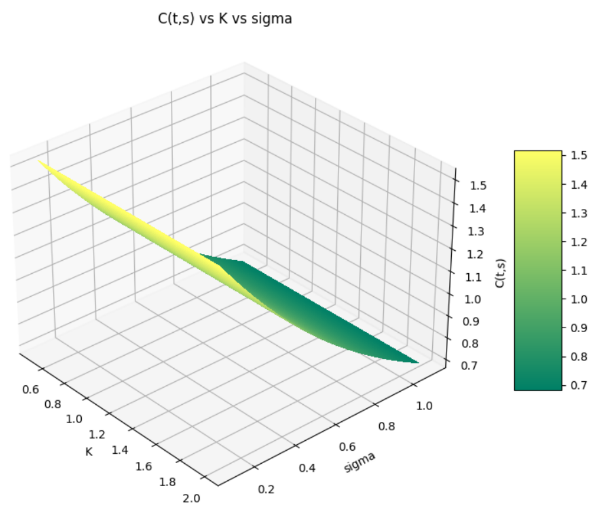
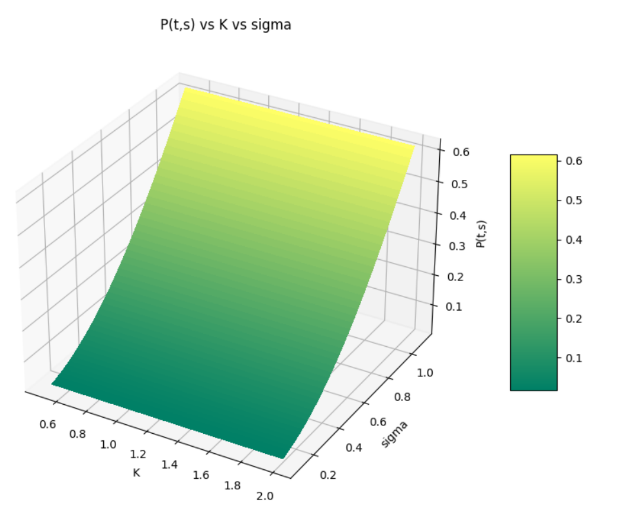
**Variation of C(t,s) and P(t,s) with Expiry Time (T) and Rate of Interest (r):**

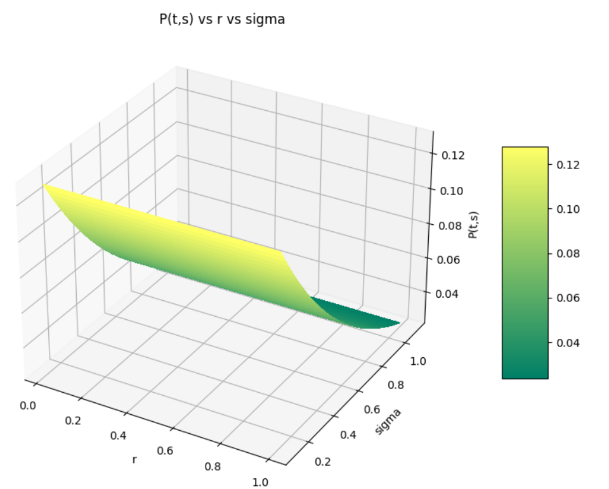


**Variation of C(t,s) and P(t,s) with Expiry Time (T) and Volatility (sigma):**

**Variation of C(t,s) and P(t,s) with Strike Price (K) and Rate of Interest (r):**



**Variation of C(t,s) and P(t,s) with Strike Price (K) and Volatility (sigma):**

**Variation of C(t,s) and P(t,s) with Rate of interest (r) and Volatility (sigma):**

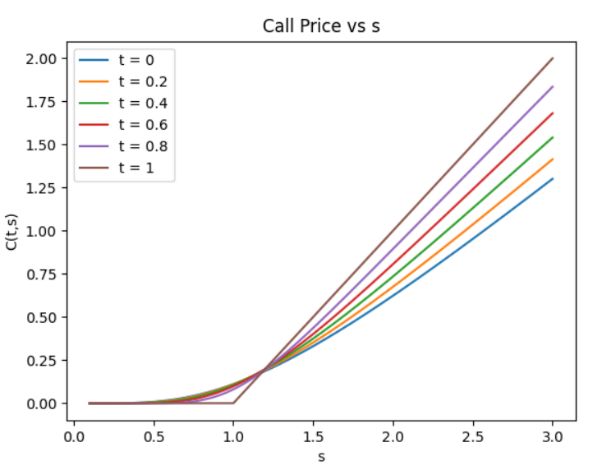
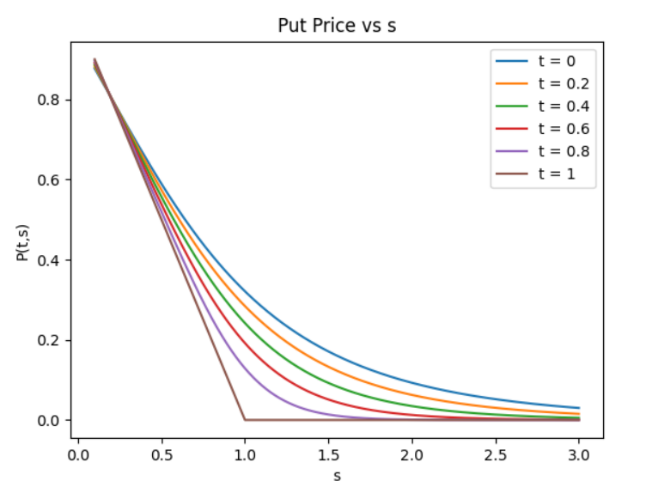
**Q5**

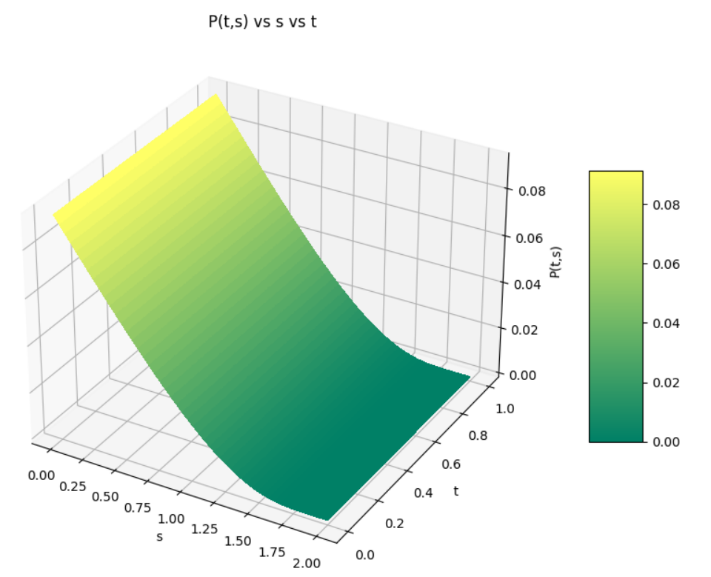
Formula used for calculating the Put and Call option price in the classical BSM framework with dividend paying stocks is:

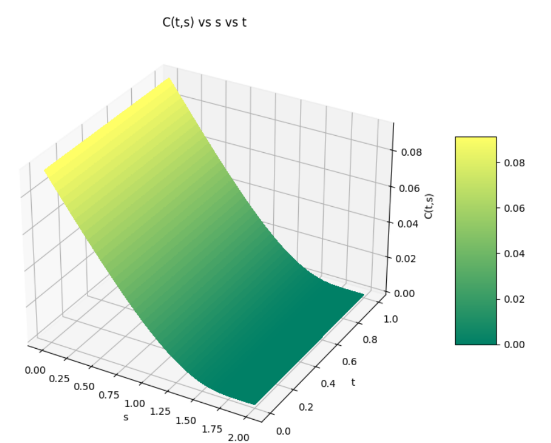
where,

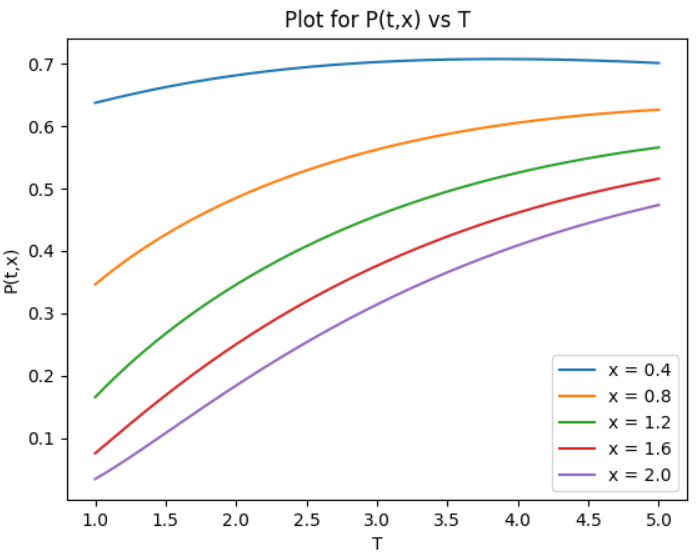
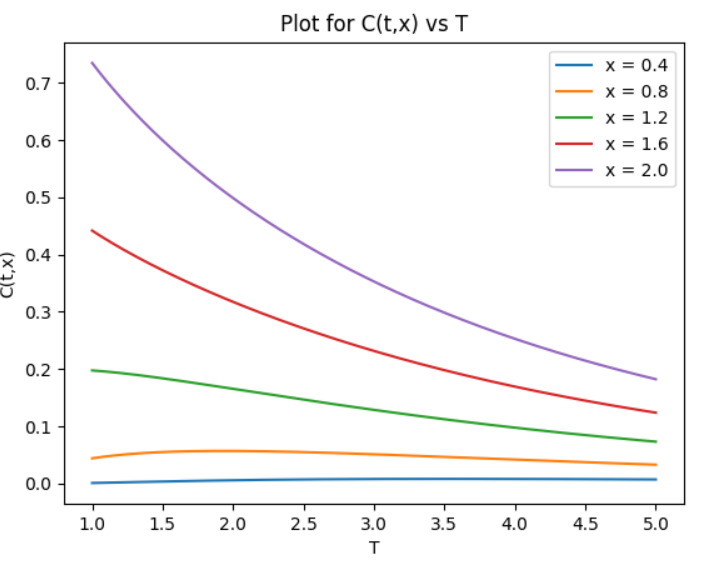
The parameter values are adjusted as needed, and when specific parameter values are needed, they are obtained as:

, a = 0.3

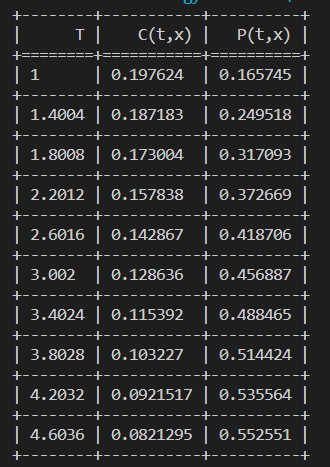
**Variation of C(t,s) and P(t,s) with Stock Price (s):**

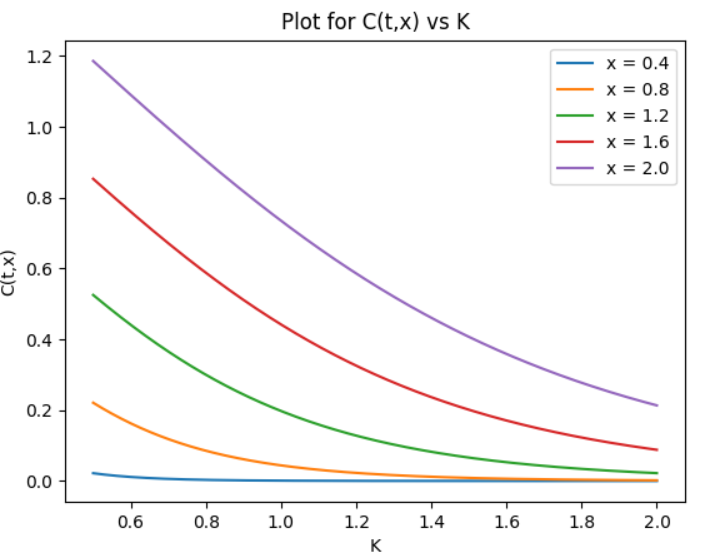
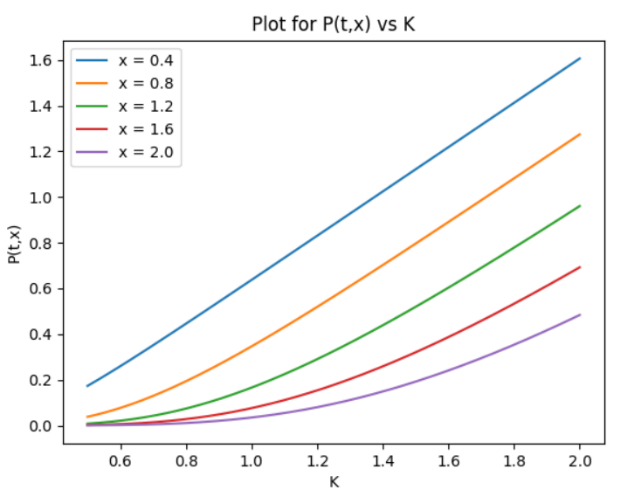
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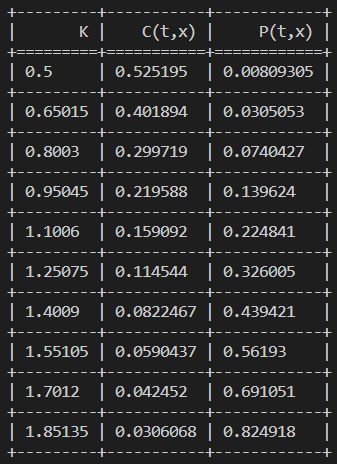


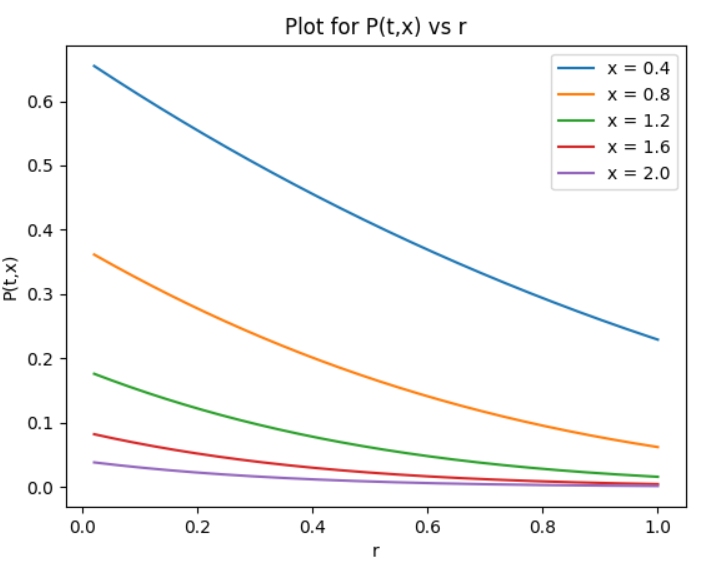
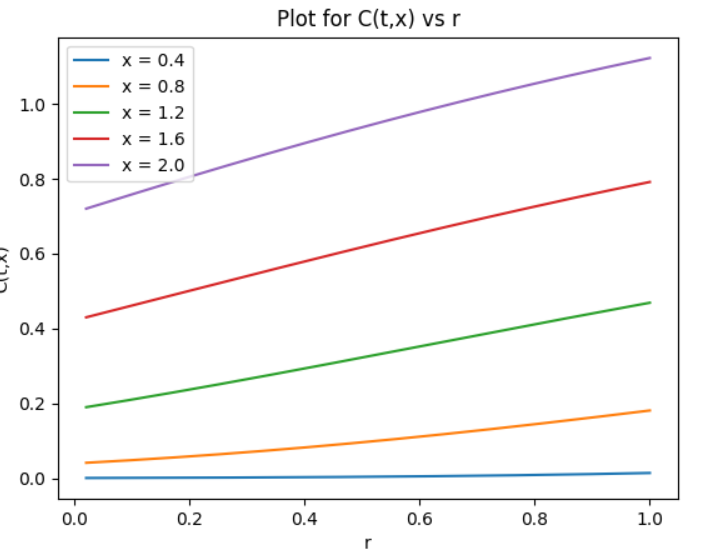
**Variation of C(t,s) and P(t,s) with Expiration Time (T):**

Some of the values are: (with parameters as and )

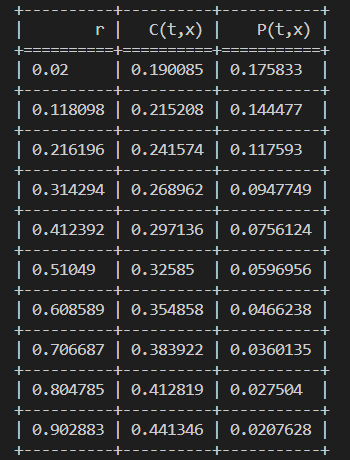


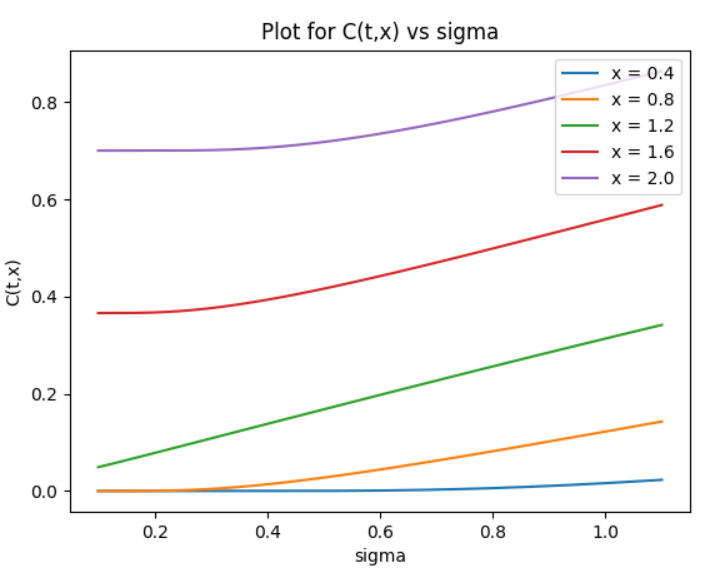
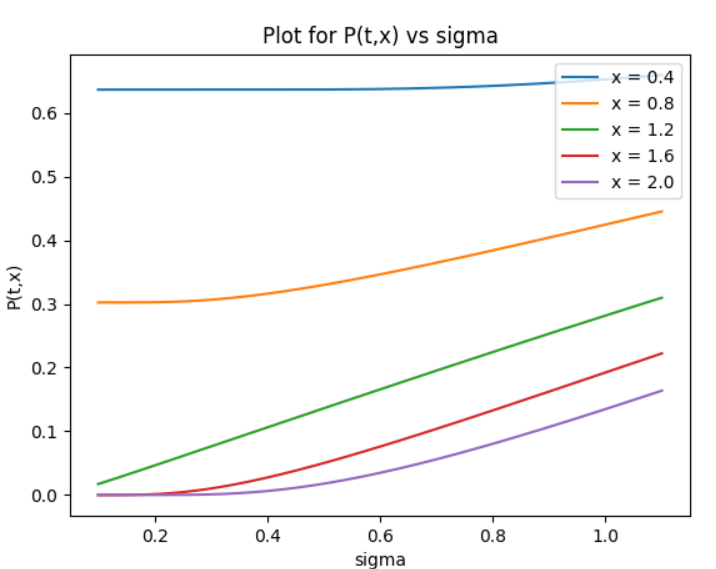
**Variation of C(t,s) and P(t,s) with Strike Price (K):**

****Some of the values are:(with parameters as and )

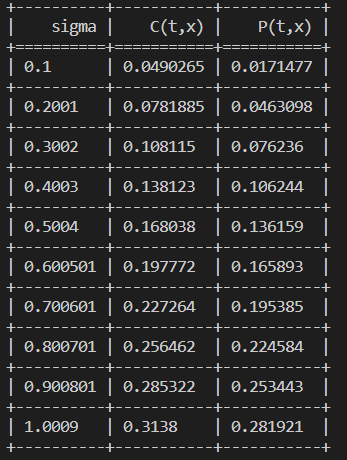
**Variation of C(t,s) and P(t,s) with Rate of Interest (r):**

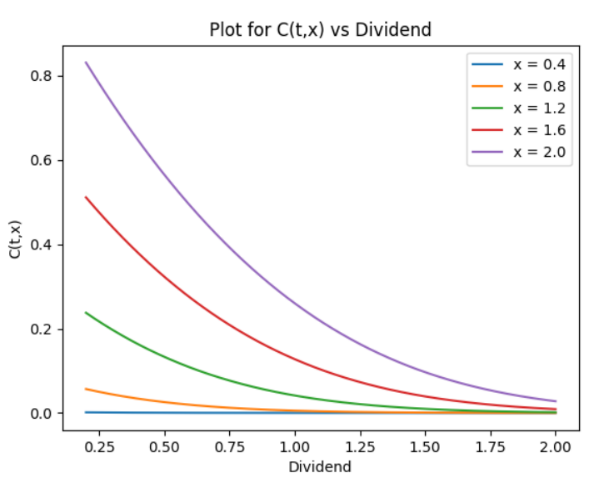
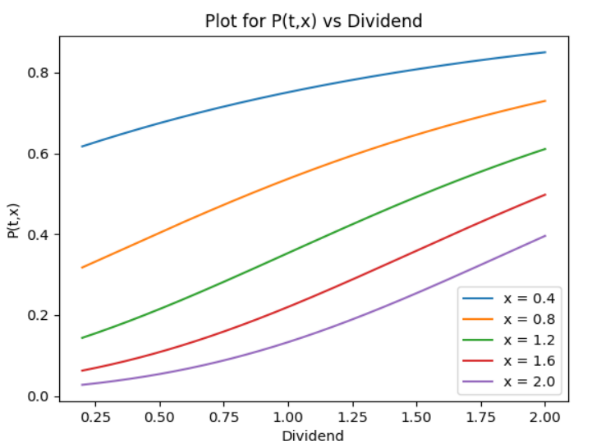
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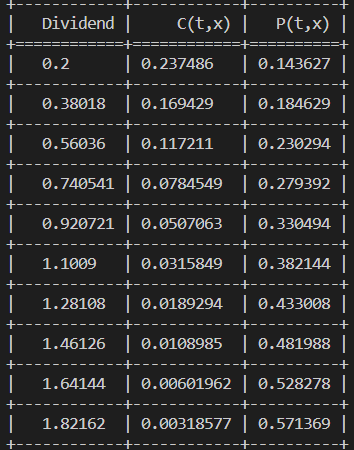
**Variation of C(t,s) and P(t,s) with Volatility (sigma):**

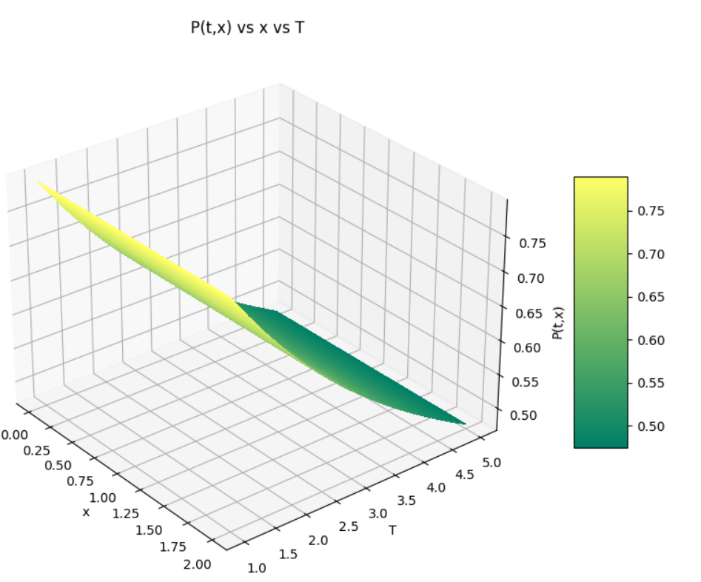
Some of the values are: (with parameters as and , a = 0.3)

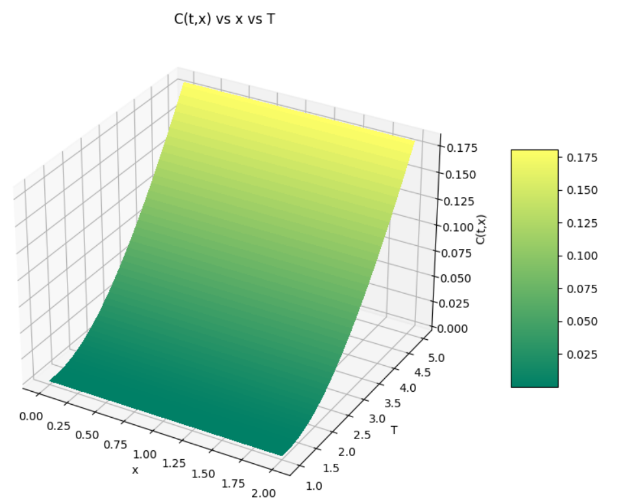


**Variation of C(t,s) and P(t,s) with Dividend (a):**

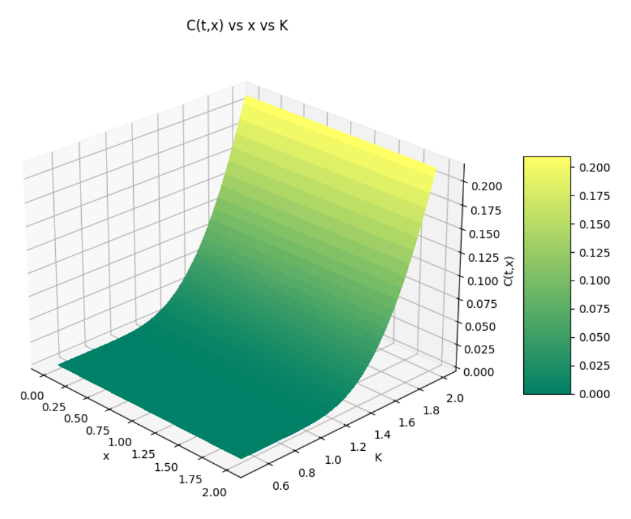
Some of the values are: (with parameters as and , a = 0.3)

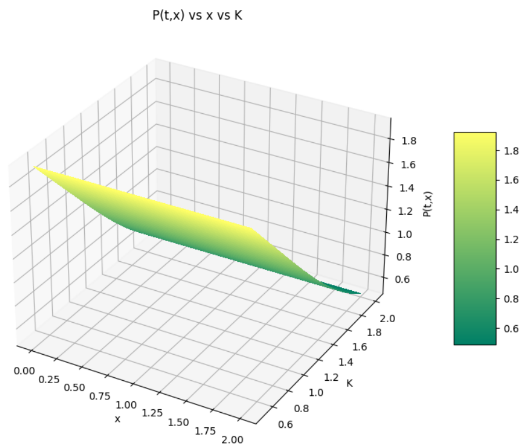


**Variation of C(t,s) and P(t,s) with Stock Price (s) and Expiration Time (T):**

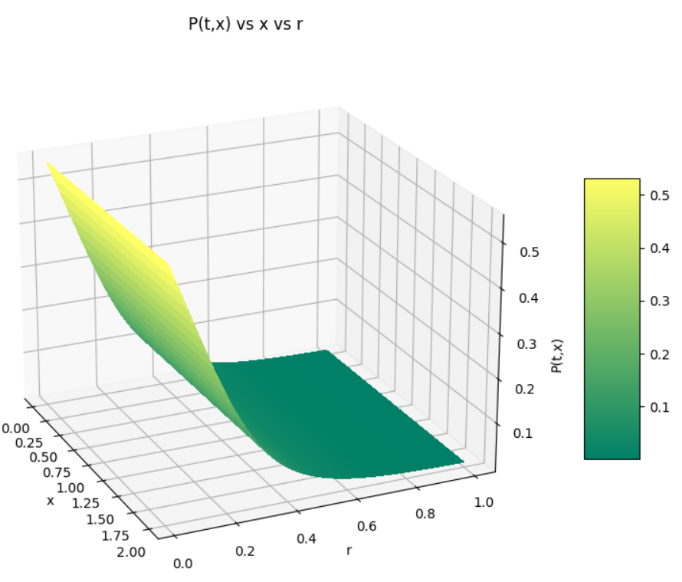
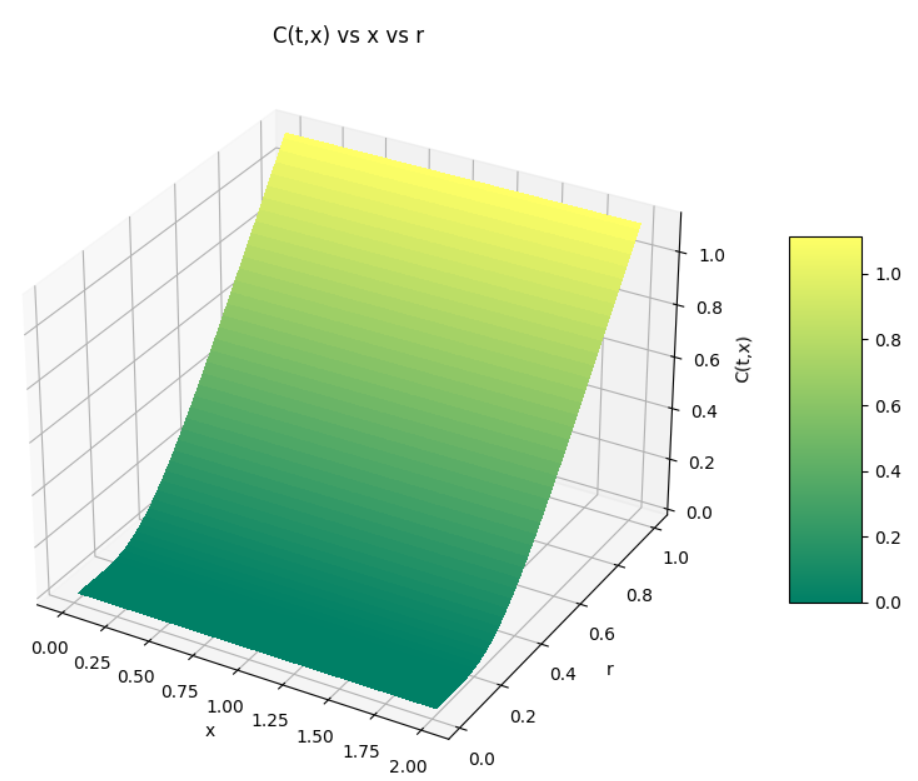
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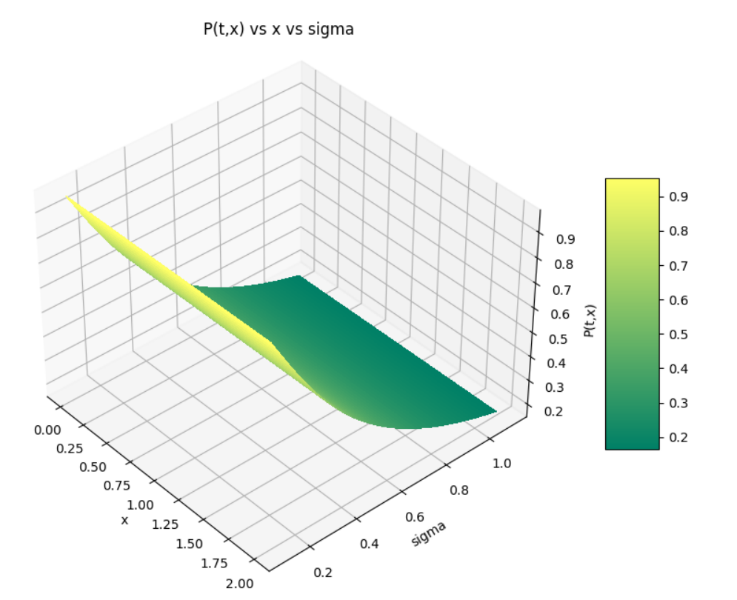
**Variation of C(t,s) and P(t,s) with Stock Price (s) and Strike Price (K):**

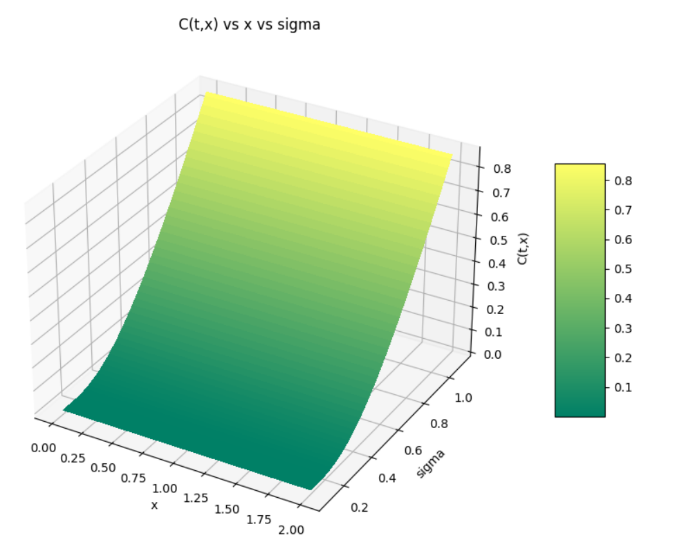




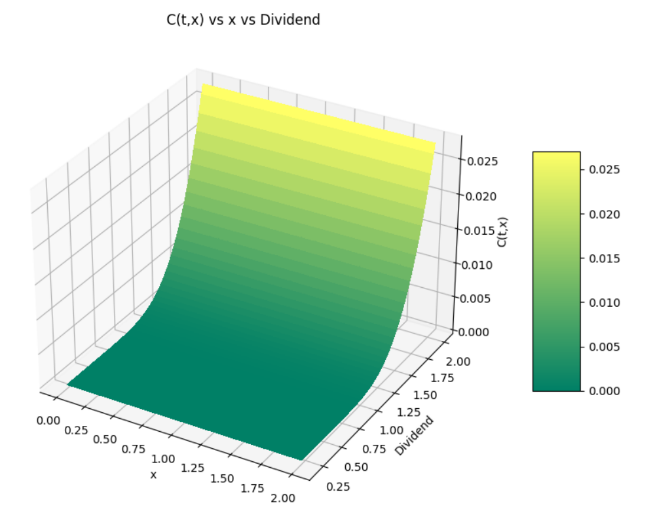
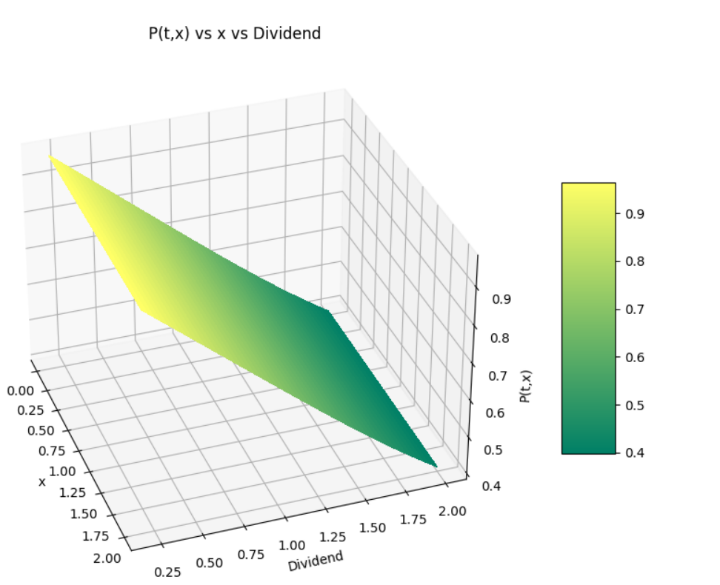
**Variation of C(t,s) and P(t,s) with Stock Price (s) and Rate of Interest (r):**

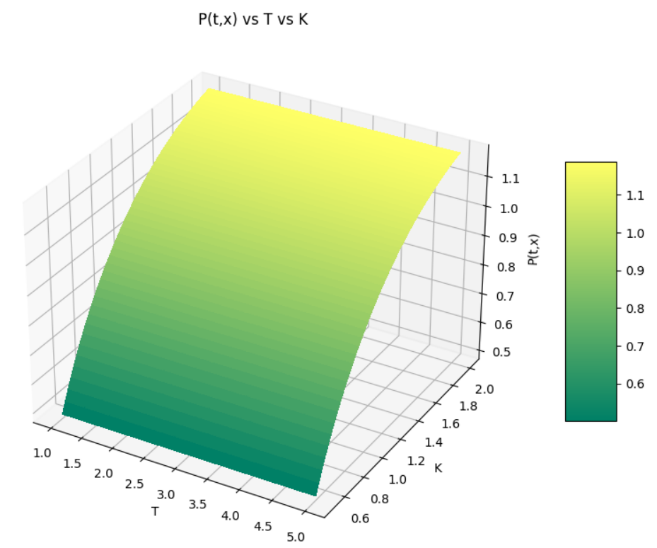
 

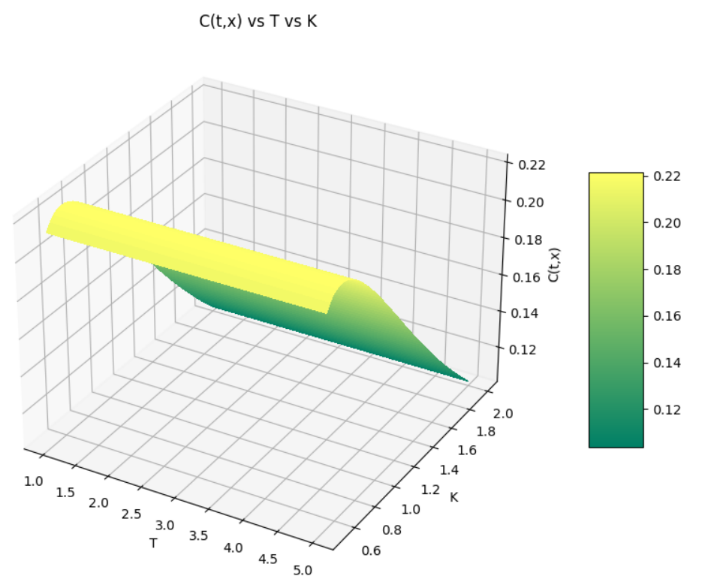
**Variation of C(t,s) and P(t,s) with Stock Price (s) and Volatility (sigma):**

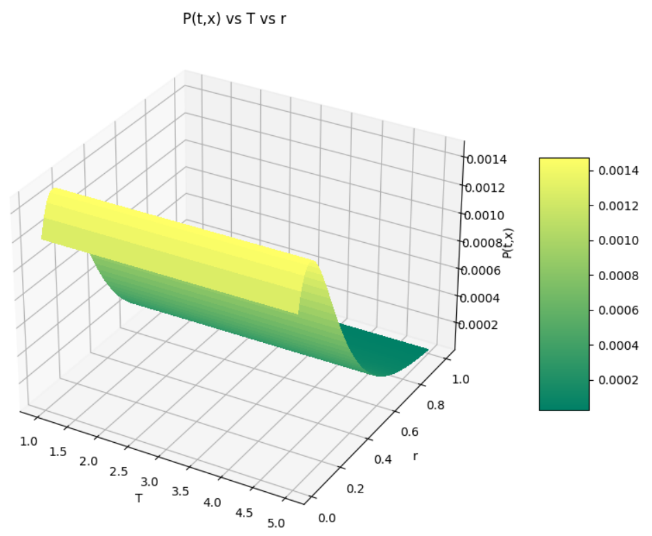
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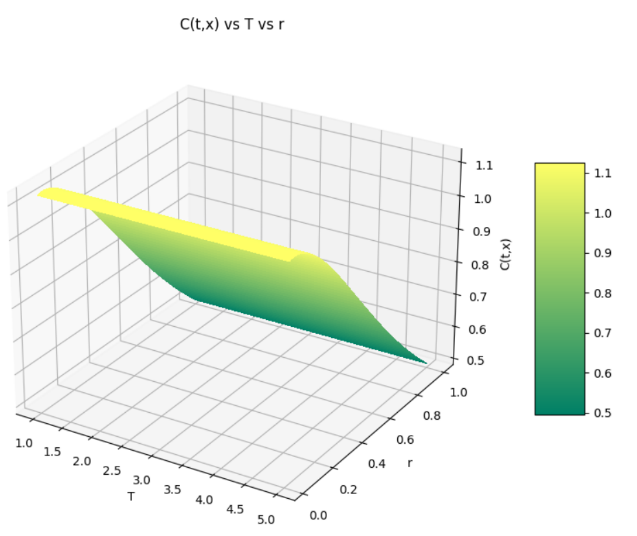
**Variation of C(t,s) and P(t,s) with Stock Price (s) and Dividend (a):**

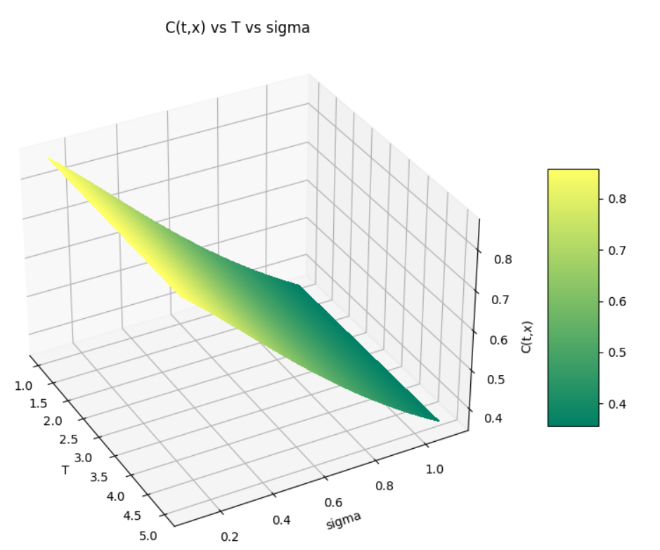
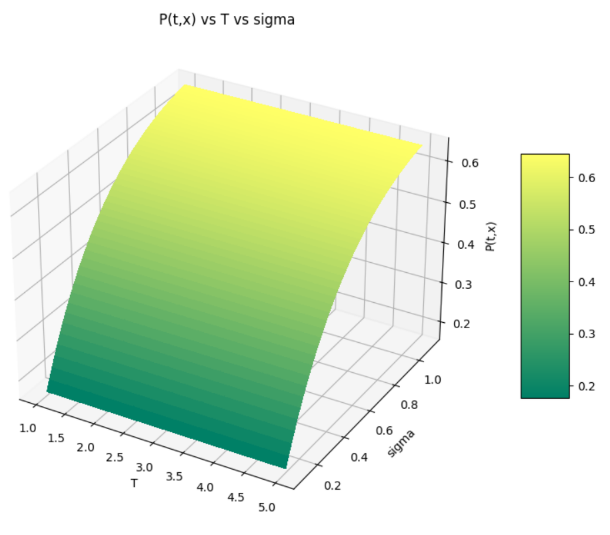


**Variation of C(t,s) and P(t,s) with Expiry Time (T) and Strike Price (K):**

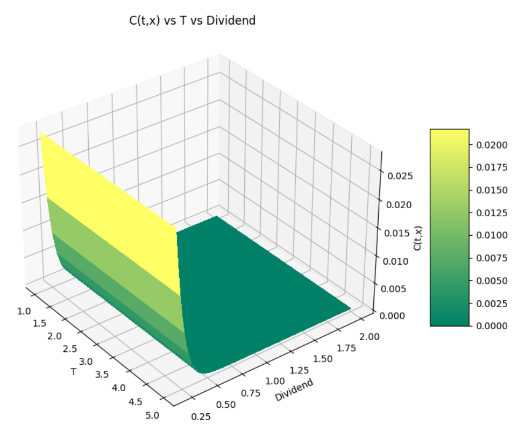
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**Variation of C(t,s) and P(t,s) with Expiry Time (T) and Rate of Interest (r):**

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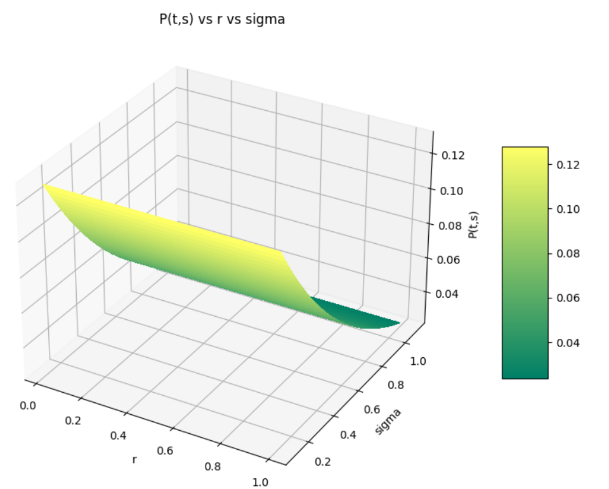
**Variation of C(t,s) and P(t,s) with Expiry Time (T) and Volatility (sigma):**

**Variation of C(t,s) and P(t,s) with Expiry Time (T) and Dividend (a):**

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**Variation of C(t,s) and P(t,s) with Strike Price (K) and Rate of Interest (r):**

**Variation of C(t,s) and P(t,s) with Strike Price (K) and Volatility (sigma):**

**Variation of C(t,s) and P(t,s) with Rate of interest (r) and Volatility (sigma):**