

Fundamental Theorem for Line Integrals

1. Let $f = xy + e^x$.

a) Compute $\mathbf{F} = \nabla f$.

b) Compute $\int_C \mathbf{F} \cdot d\mathbf{r}$ for each of the following paths from $(0,0)$ to $(2,1)$.

i) The path consisting of a horizontal segment followed by a vertical segment.

ii) The path consisting of a vertical segment followed by a horizontal segment.

iii) The straight line from $(0,0)$ to $(2,1)$.

c) All of the answers to part (b) should be the same. Show they agree with the answer given by the fundamental theorem for line integrals.

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