

Quiz 7 MATH 3503 FALL 2018

Compute $\int_C 2y dx + 2x dy$ where C is line segment
from $(0,0)$ to $(4,4)$.

Soln: In class \rightarrow did using FTLI.

Now: parametrize segment as $\begin{cases} \vec{r}(t) = t\langle 4,4 \rangle + (1-t)\langle 0,0 \rangle \\ = \langle 4t, 4t \rangle \\ 0 \leq t \leq 1 \end{cases}$

Then $\vec{r}'(t) = \langle 4,4 \rangle$, so compute

$$\begin{aligned} \int_C 2y dx + 2x dy &= \int_C \langle 2y, 2x \rangle \cdot d\vec{r} \\ &= \int_0^1 \langle 2(4t), 2(4t) \rangle \cdot \langle 4, 4 \rangle dt \\ &= \int_0^1 32t + 32t dt \\ &= \int_0^1 64t dt \\ &= \left. \frac{64}{2} t^2 \right|_0^1 \\ &= 32 \end{aligned}$$