

Math 2120H: Assignment IV

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Problem 1. Evaluate $\int_C(xy + y + z)$ along the curve $\mathbf{r}(t) = 2t\mathbf{i} + t\mathbf{j} + (2 - 2t)\mathbf{k}$, $0 \leq t \leq 1$.

Solution 1.

Problem 2. Find the mass of a thin wire lying along the curve $\mathbf{r}(t) = (\sqrt{2})t\mathbf{i} + (\sqrt{2})t\mathbf{j} + (4 - t^2)\mathbf{k}$, $0 \leq t \leq 1$, if the density is $\delta = 3t$.

Solution 2.

Problem 3. Find the line integral of $F = 3y\mathbf{i} + 2x\mathbf{j} + 4z\mathbf{k}$ over the path $(t) = t\mathbf{i} + t^2\mathbf{j} + t^4\mathbf{k}$, $0 \leq t \leq 1$.

Solution 3.

Problem 4. Find the flux of the fields $F = 2x\mathbf{i} + (x - y)\mathbf{j}$ across the circle $\mathbf{r}(t) = (a \cos t)\mathbf{i} + (a \sin t)\mathbf{j}$, $0 \leq t \leq 2\pi$.

Solution 4.