

1. **STOKES' THEOREM IN PRACTICE**

- (a) Pick any (3-dimensional) regular domain $D \subset \mathbb{R}^3$, and choose any exact 3-form $\omega = d\tau$ on \mathbb{R}^3 which is not zero anywhere on D . Do **not** use the standard volume element $dx \wedge dy \wedge dz$. Compute $\int_D \omega$.
- (b) Now let $S = \partial D$, so that S is at least piecewise a 2-dimensional closed submanifold of \mathbb{R}^3 . Let σ be the pullback $i^*\tau$ of τ above under the imbedding map $i : S \rightarrow \mathbb{R}^3$, which is equivalent to the restriction of τ to S with an appropriate choice of independent variables. Compute $\int_S \sigma$.
- (c) Compare your answers.