1. Introduction

~~In physics and mathematics, Green'~~Green's theorem ~~gives~~indicates the relation~~ship~~ between a line integral around a simple closed curve C and a double integral over the ~~plane~~plane region D bounded by C. This theorem is an application of the fundamental ~~Theorem~~theorem of calculus to integrate~~ing~~ a certain combination~~s~~ of derivatives over a plane. It can be ~~proven~~ easily proven for rectangular and triangular region~~s~~. As ~~B~~both sides of ~~it's~~its equality are finitely additive and almost all planar regions can be divided into triangles and rectangles~~, so that~~ the result holds for any planar~~-~~ region ~~practically all of, which can be divided in to triangles and rectangles~~. This proves ~~—~~the theorem for reasonably shaped regions. ~~It's~~ Its generalization to ~~the~~ non~~-~~planar surfaces (~~—proved~~ directly proved ~~from it by~~ using the finite additivity of both sides~~-~~) is the Stokes' ~~Theorem~~ theorem described below.

Comment [A1]: If the first letter of a word has a vowel sound, "an" should be used, If the first letter has a consonant sound, "a" should be used.

Comment [A2]: Providing concise and clear sentences often aids clarity and enhances readability.

1.1 ~~Greens~~Green's Theorem

~~Its~~ The formal statement of Green's theorem is as follows~~—:—~~: Let S be a sufficiently nice region in the plane, and let δ S be its boundary~~;then~~. Then, we have~~:~~

Comment [A3]: Sentences should begin with the noun, following by its pronoun in subsequent sentences.

$$\iint_S \left(\frac{\partial v_2}{\partial x} - \frac{\partial v_1}{\partial y}\right) dx\,dy = \oint_{\delta S} (v_1 dx + v_2 dy)$$

where the boundary~~,~~ δ S is traversed counterclock-wise on ~~it's~~its outside cycle~~,~~ (and clockwise on any internal cycles as you can verify using zippers~~.~~)).

~~Meaning of this t~~Theorem interpretation: ~~Green's~~Green's theorem is a form that the fundamental theorem of calculus ~~take~~takes in the context of integrals over planar regions.

Comment [A4]: In academic writing, information is presented with accuracy and conciseness. Formal language is a hallmark of academic English. One way to ensure conciseness in expression is converting phrasal verbs to formal words.

For a rectangle: By the ordinary fundamental theorem of calculus, we have~~:~~

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$$\int_{x=a}^{x=b}\int_{y=c}^{y=d}\frac{\partial v_2(x,y)}{\partial x}-\frac{\partial v_1(x,y)}{\partial y}\,dydx=\int_{y=c}^{y=d}(v_2(b,y)-v_2(a,y))dy-\int_{x=a}^{x=b}(v_1(x,d)-v_1(x,c))dx$$

For a right triangle: ~~f~~For convenience, we choose a triangle bounded by line x = 0, y = 0, and $\frac{x}{a}+\frac{y}{b}=1$.

We similarly get~~:~~

$$\int_{y=0}^{y=b}\int_{x=0}^{x=a-ya/b}\frac{\partial v_2(x,y)}{\partial x}\,dxdy-\int_{x=0}^{x=a}\int_{y=0}^{y=b-xb/a}\frac{\partial v_1(x,y)}{\partial y}\,dydx$$
$$=\int_{y=0}^{y=b}(v_2(a-ay/b,y)-v_2(0,y))dy-\int_{x=0}^{x=a}(v_1(x,b-bx/a)-v_1(x,0)dx$$

Rearrangement of the right hand side gives the ~~Theorem~~theorem for rectangles and right triangles.

It means that~~,~~ for R, a rectangle or right triangle in the x-y plane~~,~~ (for which d**S** = dS**k**), we have

$$\iint_R \bar{\nabla}\times\bar{v}\bullet d\bar{S}=\oint_{\delta R}\bar{v}\bullet d\bar{l}$$

Both sides of this equation ~~is finite~~are finitely additive~~:~~, ~~that is~~i.e., if we take two disjoint regions~~,~~ and evaluate either one over both, ~~you~~we get the sum of their values on the two regions ~~separate~~ separately.

This is true even if the regions share a common boundary~~,~~ because the line integrals will cancel out over the common boundary ~~which~~ that ceases to be a boundary.

The result follows from additivity for any region that can be broken up into rectangles and triangles, which accounts for most regions we will encounter.

Comment [A5]: To use the colon correctly, you must make sure that sentence that comes before the colon is a complete, grammatical sentence.

Comment [A6]: In American English, "that" is used to introduce a restrictive clause and "which" a nonrestrictive clause.

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