

# Mathematics 3770H – Complex Analysis

TRENT UNIVERSITY, Winter 2024

## Assignment #10

### Convergence of Derivatives

*Due on Thursday, 28 March.\**

As with all the assignments in this course, unless stated otherwise on the assignment, you are permitted to work together and look things up, so long as you acknowledge the sources you used and the people you worked with.

1. Show that if  $f(z) = \sum_{n=0}^{\infty} c_n(z-a)^n$  has radius of convergence  $R > 0$ , then so does

$$f'(z) = \sum_{n=1}^{\infty} n c_n (z-a)^{n-1}. \quad [10]$$

#### Unified Field Theory

In the beginning there was Aristotle,  
And objects at rest tended to remain at rest,  
And objects in motion tended to come to rest,  
And soon everything was at rest,  
And God saw that it was boring.

Then God created Newton,  
And objects at rest tended to remain at rest,  
But objects in motion tended to remain in motion,  
And energy was conserved and momentum was conserved  
and matter was conserved,  
And God saw that it was conservative.

Then God created Einstein,  
And everything was relative,  
And fast things became short,  
And straight things became curved,  
And the universe was filled with inertial frames,  
And God saw that it was relatively general,  
but some of it was especially relative.

Then God created Bohr,  
And there was principle,  
And the principle was quantum,  
And all things were quantified,  
But some things were still relative,  
And God saw that it was confusing.

Then God was going to create Furgeson,  
And Furgeson would have unified,  
And (s)he would have fielded a theory,  
And all would have been one,  
But it was the seventh day,  
And God rested,  
And objects at rest tend to remain at rest.

Tim Joseph (Published in ANALOG, December 1975.)

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\* You should submit your solutions via Blackboard's Assignments module, preferably as a single pdf. If submission via Blackboard fails, please submit your work to your instructor by email or on paper.