DOWNLOAD PDF CONVERGENCE AND DIVERGENCE OF INFINITE SERIES OF POSITIVE TERMS

Chapter 1 : Worked example: direct comparison test (video) | Khan Academy

Before worrying about convergence and divergence of a series we wanted to make sure that we've started to get comfortable with the notation involved in series and some of the various manipulations of series that we will, on occasion, need to be able to do.

Due to the nature of the mathematics on this site it is best views in landscape mode. If your device is not in landscape mode many of the equations will run off the side of your device should be able to scroll to see them and some of the menu items will be cut off due to the narrow screen width. We do, however, always need to remind ourselves that we really do have a limit there! If the sequence of partial sums is a convergent sequence i. Likewise, if the sequence of partial sums is a divergent sequence i. Example 1 Determine if the following series is convergent or divergent. If it converges determine its value. So, as we saw in this example we had to know a fairly obscure formula in order to determine the convergence of this series. In general finding a formula for the general term in the sequence of partial sums is a very difficult process. We will continue with a few more examples however, since this is technically how we determine convergence and the value of a series. Example 2 Determine if the following series converges or diverges. If it converges determine its sum. Therefore, the series also diverges. Example 4 Determine if the following series converges or diverges. Two of the series converged and two diverged. This will always be true for convergent series and leads to the following theorem. This theorem gives us a requirement for convergence but not a guarantee of convergence. In other words, the converse is NOT true. Consider the following two series. The first series diverges. Again, as noted above, all this theorem does is give us a requirement for a series to converge. In order for a series to converge the series terms must go to zero in the limit. If the series terms do not go to zero in the limit then there is no way the series can converge since this would violate the theorem. Again, do NOT misuse this test. If the series terms do happen to go to zero the series may or may not converge! There is just no way to guarantee this so be careful! Example 5 Determine if the following series is convergent or divergent. The divergence test is the first test of many tests that we will be looking at over the course of the next several sections. You will need to keep track of all these tests, the conditions under which they can be used and their conclusions all in one place so you can quickly refer back to them as you need to. Furthermore, these series will have the following sums or values. At this point just remember that a sum of convergent series is convergent and multiplying a convergent series by a number will not change its convergence. We need to be a little careful with these facts when it comes to divergent series. Now, since the main topic of this section is the convergence of a series we should mention a stronger type of convergence. Absolute convergence is stronger than convergence in the sense that a series that is absolutely convergent will also be convergent, but a series that is convergent may or may not be absolutely convergent. When we finally have the tools in hand to discuss this topic in more detail we will revisit it. The idea is mentioned here only because we were already discussing convergence in this section and it ties into the last topic that we want to discuss in this section. First, we need to introduce the idea of a rearrangement. A rearrangement of a series is exactly what it might sound like, it is the same series with the terms rearranged into a different order. For example, consider the following infinite series. Here is an example of this. The values however are definitely different despite the fact that the terms are the same. Here is a nice set of facts that govern this idea of when a rearrangement will lead to a different value of a series. This is here just to make sure that you understand that we have to be very careful in thinking of an infinite series as an infinite sum. There are times when we can i. Eventually it will be very simple to show that this series is conditionally convergent.

Chapter 2 : Series Convergence Tests

Is a divergent series of non-negative terms always diverging to infinity? 2 Does each term in an infinite series have to be greater than the infinite sum after it?

Due to the nature of the mathematics on this site it is best views in landscape mode. If your device is not in landscape mode many of the equations will run off the side of your device should be able to scroll to see them and some of the menu items will be cut off due to the narrow screen width. Alternating Series Test The last two tests that we looked at for series convergence have required that all the terms in the series be positive. Of course there are many series out there that have negative terms in them and so we now need to start looking at tests for these kinds of series. The test that we are going to look into in this section will be a test for alternating series. A proof of this test is at the end of the section. There are a couple of things to note about this test. It is possible for the first few terms of a series to increase and still have the test be valid. The convergence of the series will depend solely on the convergence of the second infinite series. If the second series has a finite value then the sum of two finite values is also finite and so the original series will converge to a finite value. All we do is check that eventually the series terms are decreasing and then apply the test. Example 1 Determine if the following series is convergent or divergent. The series from the previous example is sometimes called the Alternating Harmonic Series. In general however, we will need to resort to Calculus I techniques to prove the series terms decrease. Example 2 Determine if the following series is convergent or divergent. So, the divergence test requires us to compute the following limit. Example 3 Determine if the following series is convergent or divergent. The first is easy enough to check. It is not immediately clear that these terms will decrease. Increasing the numerator says the term should also increase while increasing the denominator says that the term should decrease. Both conditions are met and so by the Alternating Series Test the series must be converging. As the previous example has shown, we sometimes need to do a fair amount of work to show that the terms are decreasing. Do not just make the assumption that the terms will be decreasing and let it go at that. Example 4 Determine if the following series is convergent or divergent.

Chapter 3 : Limit of a sequence - Wikipedia

In mathematics, a series is the sum of the terms of an infinite sequence of numbers.. Given an infinite sequence (,,,), the nth partial sum is the sum of the first n terms of the sequence, that is.

Chapter 4 : How to Determine Convergence of Infinite Series: 8 Steps - wikiHow

Convergence Tests for Infinite Series In this tutorial, we review some of the most common tests for the convergence of an infinite series $$ \sum_{k=0}^{\infty} a_k = a_0 + a_1 + a_2 + \cdots $$ *The proofs or these tests are interesting, so we urge you to look them up in your calculus text.*

Chapter 5 : Convergence Tests for Infinite Series - HMC Calculus Tutorial

Choose from different sets of series convergence divergence flashcards on Quizlet. This is the sum of the first n terms of an infinite series. If.

Chapter 6 : Integral test (video) | Khan Academy

either both converge or both diverge. If the above series converges, then the remainder R N = S - S N (where S is the exact sum of the infinite series and S N is the sum of the first N terms of the series) is bounded by 0< = R N <= (N.

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Chapter 7 : Calculus II - Alternating Series Test

Summary of Convergence Tests for Series Let âˆ‘ âˆž n= 1. a n. be an infinite series of. positive. terms. The series âˆ‘ âˆž n= 1. a n. converges if and only if the.

Chapter 8 : Series Calculator - Symbolab

partial sum of a positive series is greater than the last, every positive series either converges or diverges to infinity. (As we shall see later on, series with negative terms have other possible.

Chapter 9 : Calculus II - Convergence/Divergence of Series

Chap1 INFINITE SERIES We now turn to a more detailed study of the convergence and divergence of series, considering here series of positive terms. Series with.