

MATHEMATICS 2000
CALCULUS III

The sum

$$\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \dots$$

adds up to $\pi^2/6$, in the sense that it gets closer and closer to $\pi^2/6$ as the number of terms gets larger and larger. It is also known that

$$\frac{1}{1^3} + \frac{1}{2^3} + \frac{1}{3^3} + \frac{1}{4^3} + \dots$$

adds up to something even though the answer cannot be expressed exactly. In contrast to these two series, it is easily proved that

$$\frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \dots$$

doesn't *add up* at all: by taking enough terms, we can make its total surpass any given number.

The use of convergent infinite series to represent functions is an important step in the development of the calculus. This course explores these ideas to complete the calculus of a single variable and then generalizes the processes of differentiation and integration to deal with functions of several variables. Mathematics 2000 is a required course for majors in mathematics and statistics, computer science and physics.

Text. The text currently in use is *Calculus: Early Transcendentals (loose-leaf Edition)* by Jon Rogawski.

Marks. Generally 40% of the final grade is given for two term tests and homework assignments, and 60% for a final examination.

Calendar description. **2000 Calculus III** is a study of the differential calculus of functions of two variables, an introduction to convergence of infinite sequences and series.

Prerequisite: MATH 1001

Note: Credit cannot be obtained for both Mathematics 2000 and any of the former Engineering 1411, 1412, 2412, or 2413.

Offered. Fall, Winter, Spring