PfaffModule7L03

Fri, 1/21 1:47AM 5:41

SUMMARY KEYWORDS

interval, change, riemann sums, function, constant rate, multiply, equals, constant, dt, integration, exclamation points, traveled, rate, area, cost, looked, big, setup, dc, months

SPEAKERS

Catherine Pfaff

Welcome. In this lecture, I'm going to go through kind of like a warm up example for Riemann sums and integration to kind of give you some intuition and belief in kind of how this works. So let's, here's our setup, which is that, so here's the setup. Okay, so suppose that we have that, so again, two things going on here. So the first one is that DC DT equals 3, okay? And so cost, in other words, we have that cost is increasing at a constant rate, at a constant rate of $3 per month. Okay, so this is actually, it's a constant function. Our rate of change is actually constant function in this particular circumstance. Okay? And then the second part of it is that we have this kind of time interval, is and so we have, this is going to be the time interval, it's going to be 0, 4. And this is going to be in months. And this is in months.

Okay, so that's kind of our setup. So that we have, we know that those two things are happening. Then we have that the cost change is going to equal, and you could think of this, instead of thinking of the cost change, you could think of this as like the speed that you're driving. If I wanted to figure out the change in my location, or the distance traveled, and I knew the speed I was driving, I would multiply that by the time if it was constant, right? So we take the rate of change, DC DT, and then multiply this by the time, right. So in this circumstance, that would be 3 times 4. Right? Because that 4 is coming from the length of that interval. And that would give me 12. Okay, well, pictorially actually, so you can see this pictorially. So if I have here, so this is like my Y. And this is my, my time T, okay? And then I had, right, my rate of change is actually steady. So it's a constant function. So it's just flat like this. So this is like my Y equals DC DT equals 3. Okay, right? So you can see there that you've got, this is the graph of that function, actually, the rate function. Then if I looked on this interval, right, this is my interval. So I'm going from zero to 4. So this length here is 4. And I multiply that by this height of 3. And I looked at this area here, enclosed, well, what do I get? I get 4 times 3, which is 12. Okay, so this area actually equals 12.

Okay, so I looked at my rate of change function, I looked at the area under it on the interval and I multiplied that length of that, by that height, which is actually the same thing is that constant rate of change. And I, that area that I got was actually indeed, kind of the cost change or the distance traveled or whatever. Okay, so here's kind of the big question. So, kind of our big question, which forces us to actually want to look at integration. Okay, which is, what if the rate of change isn't constant? So what if our rate of change is not constant? Like here it was a constant value of 3. But what if it was a different kind of function? So it was not constant, i.e, isn't the constant function?

So not the constant function, or not a constant function like the constant function that always outputs 3? Okay. Big question. So, exclamation points and question marks. Okay? And the answer series is going to be Riemann sums and integration, okay? So that's kind of where we're going with this, but it's exactly the same. I think you should keep that picture in mind to be actually getting the area when you're looking at your rate of change function, and then over that particular time interval, okay? So I hope that made some sense, and I'll see you in the next lecture.