

PfaffModule7L01

Wed, 1/12 12:51PM 3:41

SUMMARY KEYWORDS

rate, change, integration, function, slope, dt, cost, dc, preamble, answer, confused, retrieve, traveled, little bit, confusing, increase, input, respect, quantity, emphasize

SPEAKERS

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Welcome. In this lecture, I kind of want to give a little bit of what I called preamble to kind of talking about what integration is kind of about or its purpose. So I first one to kind of recall something you're already a little familiar with. So we start with a function like the cost function, and we have, we need to know, kind of what its input is, because we're going to need to know what we're going to change, we're looking at the rate of change with respect to whatever the input is. So in this circumstance, we'll say it's time, then we know that the rate of change of this function with respect to time is going to be DC/DT . That's also the slope at that point of the graph. So the graph of the function, the cost function here, at the particular point, so if I have a particular time value, I have time and then I have the cost at that time. And the slope there is actually DC/DT , right? But it's actually DC/DT , and let's kind of specify this that this is actually evaluated at that particular time. Okay? So then this gives us the slope at that particular time, or the rate of change at that particular time. So what's going to be new here? So this is new, which is, what if we instead, and I'm going to make this green to kind of indicate that we're starting with the rate of change. So what if we start with the rate of change of the cost? So what if we start with the rate of change of the cost?

Change of the cost DC/DT , okay? And I'm going to emphasize here, remember, this is a function. I stick it in, I stick in the time and then I get out on the rate of change at that particular time, okay? Then can we retrieve the cost increase? Okay, so can we retrieve with a change of cost, to retrieve the cost increase, so the cost increase over a time interval?

Okay, or you could think of it, let's say I have the velocity, right? That's a rate of change, can I go back to knowing like the distance traveled? Okay? And the answer to all these kinds of questions of going from the rate of change to the, actually kind of like, the difference in quantity? So the answer is yes, and this is, this will be integration. This is entirely what we're interested in doing. Okay, and I'll kind of map that out a little bit more in the future. But it's good to kind of have this kind of in mind that I'm now, before I was going from a change in quantity to a change of, like to a rate of change. And that was a function that gave me the rate of change of the function at a particular time. So it's always a little confusing. I'd say that people continue getting confused about that for many years. So

it's good to get that straight in your head now. But sometimes you actually want to go from the rate of change back to a change in quantity, and this is what integration is going to do for us. Okay? So, I hope that made some sense, and I'll see you in the next lecture.