

MITOCW | MIT8_01F16_w01s02v06_360p

Now that we've described the displacement of our object-- remember that our displacement vector $\Delta \mathbf{r}$ in this time interval was $\mathbf{x}(t) + \Delta \mathbf{t}$ minus $\mathbf{x}(t)$ i hat, which we denoted as $\Delta \mathbf{x}$ i hat.

Now, let's just remind ourselves that this distance here, that's Δx , and this whole distance from here over to there-- that's what we mean by $\mathbf{x}(t) + \Delta \mathbf{t}$.

And now what we'd like to do is describe what we call average velocity.

And our average velocity depends on our time intervals.

So this is for the time interval t to $t + \Delta t$ while the person has displaced a certain amount of vector $\Delta \mathbf{r}$.

And our definition for \mathbf{v} average-- it's a vector quantity, so we'll write \mathbf{v} average-- will use three bars to indicate a definition.

It is the displacement during a time interval Δt .

So, as a vector, we have $\Delta \mathbf{x}$ over Δt i hat.

And this component here is what we call the component of the average velocity.

So this is the component of the average velocity.

And, again as before, this component can be positive, zero, or negative depending on the sine of Δx .

And the key point here is that average velocity depends on whatever time interval you're referring to.

So that's our definition of average velocity.

And now what we want to do is consider what happens in the limit as Δt becomes smaller and smaller and smaller.

And that will enable us to introduce our concept of instantaneous velocity.