Social Networks
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Link Analysis (Continued)

Lecture – 111
Addition of Two Vectors (Pre-requisite 2)

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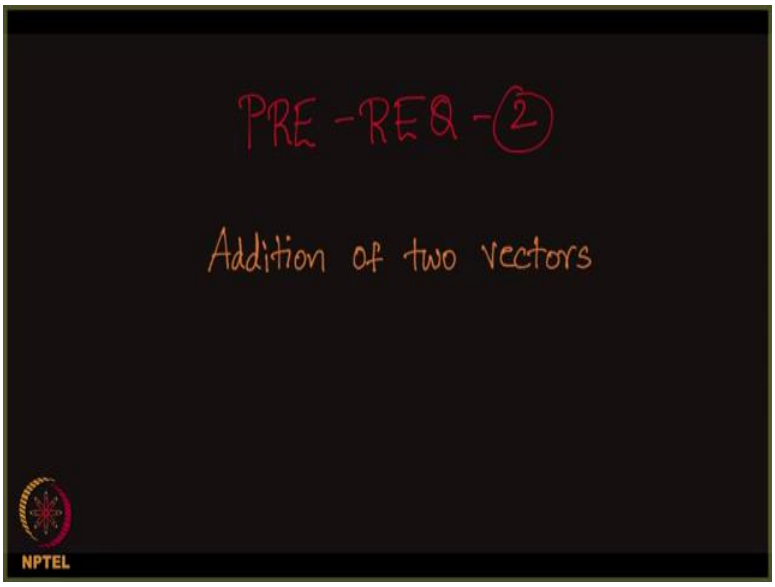

Let us start with another prerequisite right now. I spoke about the first prerequisite which is the fact that the matrix multiplication on a vector leads it to convergence state. And now I am talking about the second prerequisite which is which is actually a very straightforward observation. It is about addition of two vectors. We have studied the notion of scalars and vectors in our high school days; I am just going to revise that and make some subtle observation about them ok. What happens when you add two vectors? Is a very straightforward question we all have added (a, b) vector, (a, b) added with (c, d) gives you a + c and b + d correct, but we have not observed something important here. Let us observe that now.

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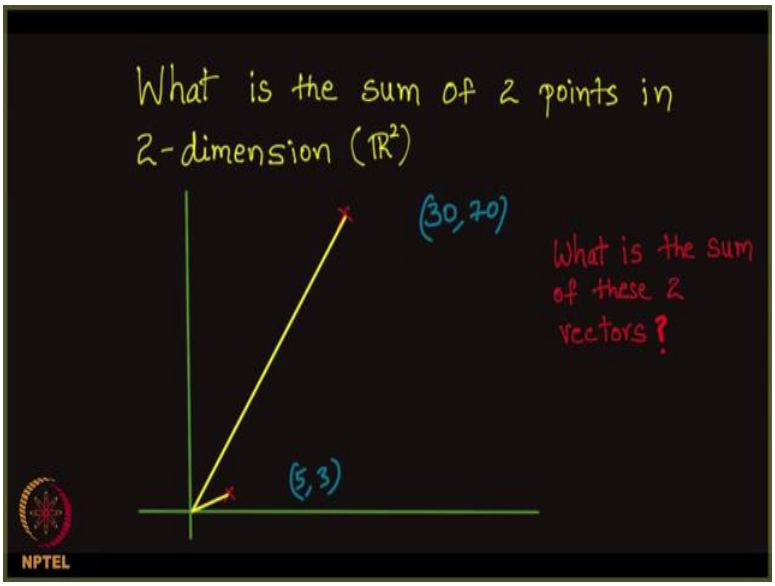

So, here is my question. What is the sum of two points in two dimension? Let us say this is my two-dimension plane; and this is my first point. I will give it some name; let us say at the point (30, 70) all right. And another point sort of relatively close to origin and this point is (5, 3) all right. So, let me join the corresponding vector. What do you mean by that? You just join the, origin and the point by a line this is called the position vectors right.

As you saw I did that for both ok this one as well as this one; Next what is the sum of these two vectors? What can you say about the sum of these two vectors? This is the right time for you to pause the video and compute the sum. And look at where exactly the sum comes. What is the sum 30 plus 5, 70 plus 3, (35, 73)? Where exactly is this point? What is its direction? My direction I mean when you join the origin and this point. Is it close to the point (30, 70) or is it close to the point (5, 3) is a question in hand? Let us see that in detail now.

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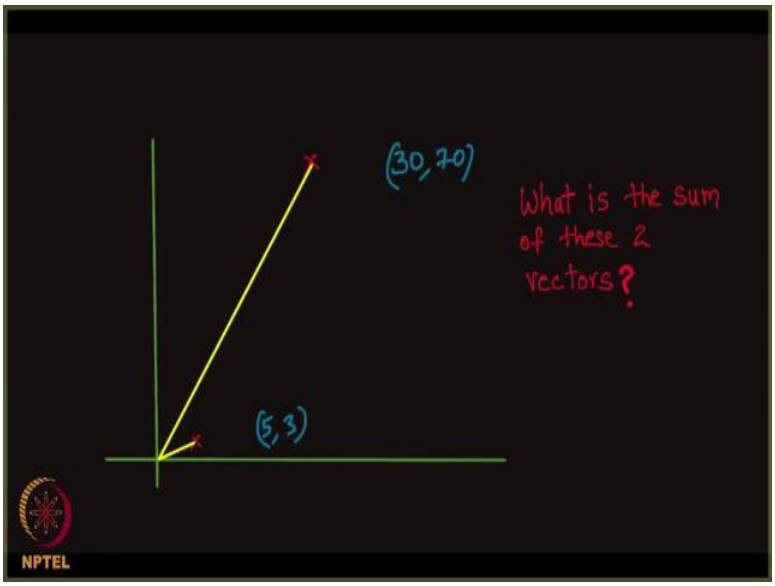

So, let me write that once again. And my question is what is the sum of these two vectors right and I will try to find the sum very; obviously, the sum is simply this point that is the sum of (30, 70) and (5, 3) right.

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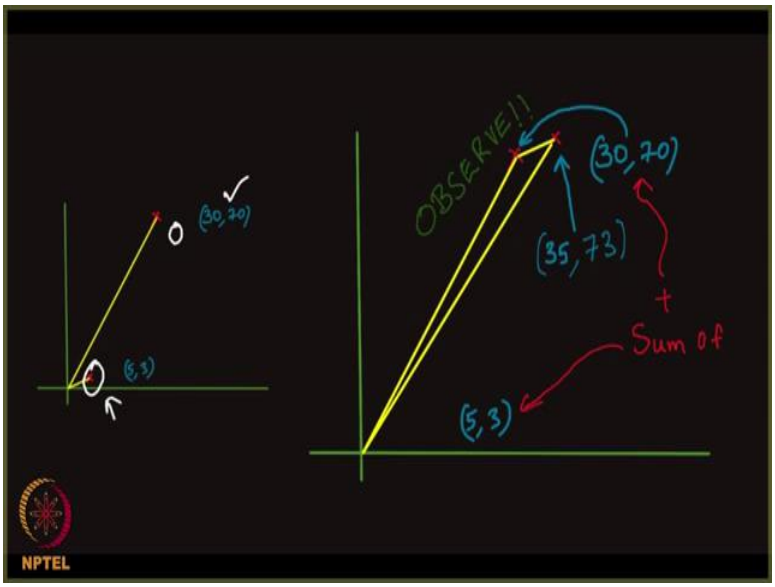

And I did not mean to exaggerate this concept. It is a very straightforward concept, but there is the observation is not so straightforward. The observation comes next. This (35, 73) is close to (30, 70) than (5, 3).

This vector as you can see (5, 3). The resultant vector is somewhere (35, 73) is somewhere close to this vector than to this vector; did you observe that? Yeah and I am sure you know the reason as well ok. We observed this next.

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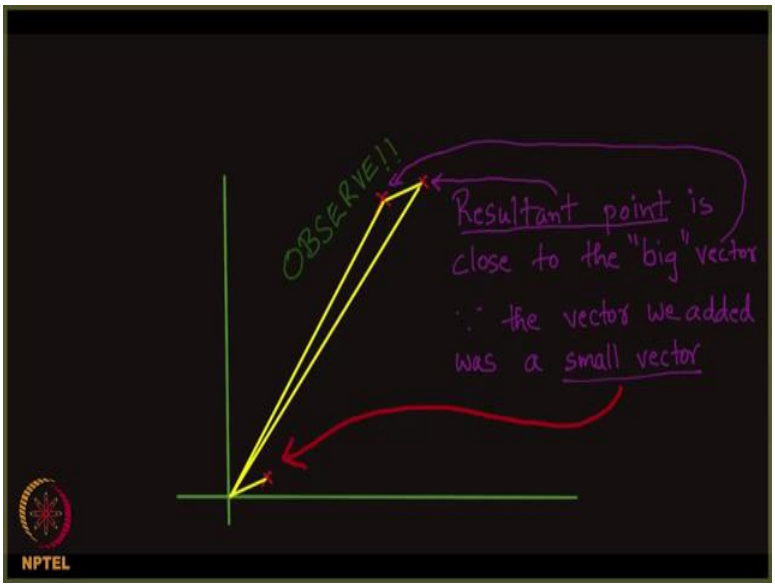

So, let us see what exactly this means. The resultant point is close, when you add the resultant point is close to the big vector. Whatever I mean the big vector, the vector that is big in amplitude. This is the big vector I am talking about; the resultant point which is this is close to the big vector. Because the vector we added was a small vector, please note if two vectors which are of the same amplitude when you add, this may not happen. This will happen only when you take a big vector and add it to the small vector. What do you mean by a big vector? A vector with a big amplitude is called a big vector. And this is a small vector because it the amplitude is small right ok.

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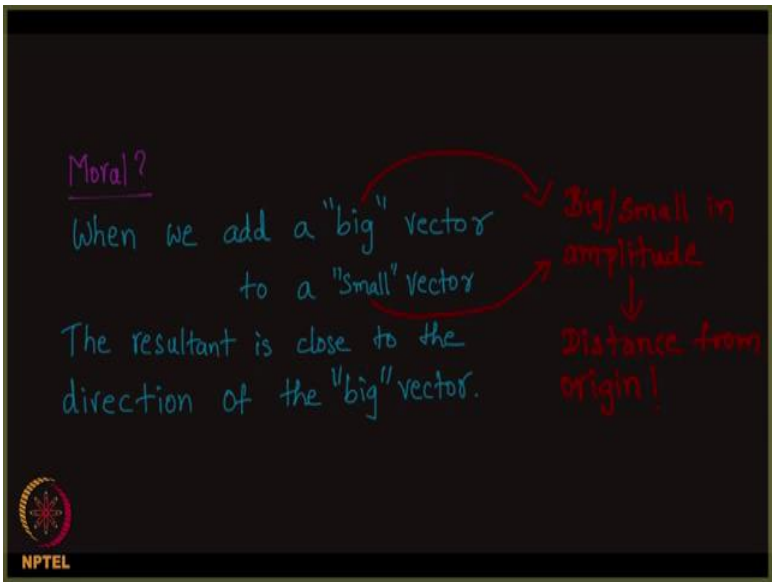

So, this is a small vector right ok. What is a model that we learned just now? What do we observed just now? So, you can pause and think about what we just now said. And then continue the video. When we add a big vector to a small vector, the resultant vector is close to the direction of the big vector big in codes right; perfect although pretty obvious you will even be wondering why I even had, a lecture on this such a simple concept.

This is the displays a key role in understanding the convergence of the matrix that we discussed previously right. So, it is important for us to spend some time on these seemingly trivial concepts. Most of the concepts are trivial, but their significance is very high. So, it is important for us to understand although appealingly trivial example. And it is important to us to understand these concepts one level deep. Because they will come in not so obvious places; and we may not be able to interpret them properly.

So, big and small by big and small I mean in the amplitude as I told you people right, perfect. So, this is the distance from the origin and its revising whatever. So, simply the moral is very clear to you people when you add a big victor to a small vector, you get a vector close to the big vector both in direction as well as amplitude ok.

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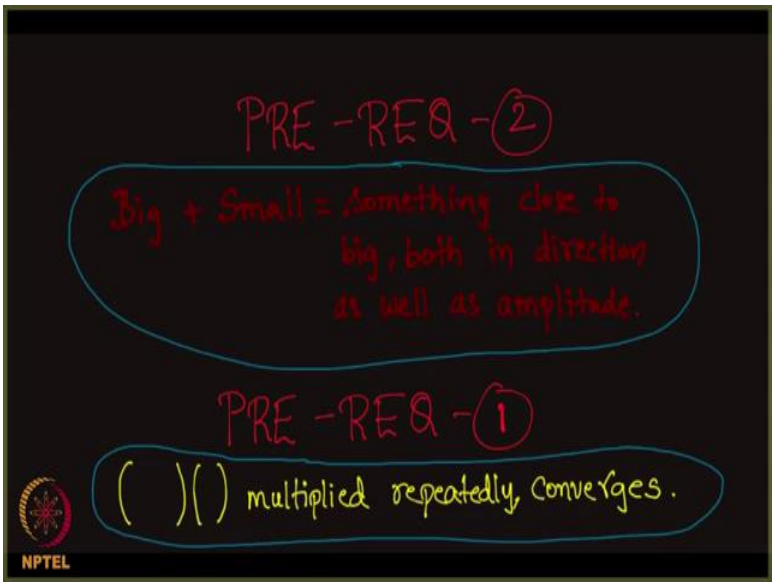

So, Big plus small is equal to something close to big both in direction, as well as amplitude.

So, this was our prerequisite 2. And it will help if we can recollect prerequisite 1. Can you all recollect? What is prerequisite 1? Was this prerequisite 1 was simply the fact that when you multiply a matrix to a vector repeatedly it converges. So, please ensure that you do not go further without understanding this prerequisite 1 and 2.