In this lecture we are going to take a deeper look into one of the interesting aspects of the price action trading volume one, which is the use of abstract vector spaces to analyze charts. If you remember from the first volume, the idea of abstract vector spaces is basically deriving non-obvious abstract vectors from real price vectors in the chart. The theory says that these other implicit vectors can show useful information, or at least complementary information to the real price vectors most of us are used to work with.

There are many different ways of drawing these types of vectors, and there are also many ways in which we can mix them with the other techniques in the fractal flow price action theory as you'll see later. This example I'm about to show you makes it really hard to say that such techniques don't hold water to reality because their level of precision is sometimes so great, that the probability of this precision being a coincidence is just too low. That's especially the case when an abstract technique points so precisely to real points in the chart. Like in the previous lecture, in this video we are not going to worry about the market context or the extraction of narrative. We are only going to focus on the linework aspect for educational purpose.

Notice that in this chart I have drawn a downward standard pitchfork using alternating highs and lows as the theory requires. Right from the start, just by looking at the pitchfork lines we can tell that it is valid by the way it interacts with price. Price action is clearly respecting the boundaries of the pitchfork. Here I would like to grab your attention to an important aspect that relates to the standard consensus in finance about the subtle connection between physics and the market. In the price action trading course volume one, we already talked about the fact that econophysics treats price as if it was a particle suspended in a fluid.

Mathematically speaking, both price and a particle suspended in a fluid display Brownian motion. This notion of a particle suspended in a fluid came from an experiment in botanic with a man called Robert Brown, hence the name Brownian motion. In the beginning of the twentieth century, a French mathematician called Louis Bachelier made this parallel of Brownian motion with the financial markets. In other words, price relates to the mean where it is traded in the same way that a particle relates to the fluid in which it is suspended.

Later in the twentieth century, a Japanese mathematician called Ito was able to describe the Brownian motion of markets mathematically, proving that both situations indeed had a parallel. All that serves to prove that we can indeed treat price as if it is a moving object, or to be more precise, as a particle moving and interacting with other particles. In finance, these other particles that interact with price are the economic vectors. For example, a major news in the global economy represents a major vector that pulls price. You can think about this as a large particle colliding with the particle of price. That would be the econophysical perspective.

The behavior of particles in finance has some peculiar features. In some examples in finance where we have a stationary timeseries, you would observe that the particle is mean reverting, meaning that it tends to come to the center or the mean. This happens in nonstationary timeseries too, but we cannot use that fact to trade mean reversion because in nonstationary timeseries like the chart we have in front of us, mean and standard deviation are not constant. However, the detail I want you to pay attention to here is not the mean reversion feature per se. It's the fact that when a particle gets near the mean, it tends to get agitated or unstable.

A pitchfork is a way of calculating or projecting the mean in a nonstationary timeseries like we have here. Putting what I said about price being treated like a particle and getting unstable near the mean, we can say that price tends to get unstable near the centerline

of the pitchfork. We can clearly see that happening in here. Notice how price starts to zigzag in a different way once it gets to the centerline of the fork, and starts to display a minor running flow. Another way of thinking about this is that when price reaches the centerline, it starts oscillating around it treating that centerline or mean as an axis of rotation.

On the other hand, price at the edges of the pitchfork tends to work in a stable way. As soon as price reaches the upper or lower edge, it tends to reverse direction. This is why we can use pitchfork lines to enter the market near its edges. In this chart we can also see how price treats the upper and lower lines of the pitchfork. In both extremes, as soon as price gets near the limits provided by the line, it starts to come back to the center, and when it reaches the center, it gets unstable and agitated. This is where things will start to get interesting because we have a certain duality in the markets, and I'm going to show you that by using the abstract vector space.

In this example I extrapolated the vector that corresponds to the BC segment of the pitchfork. The vector was extrapolated back in time, but not in space. That creates a series of abstract anchor points along that vector. Obviously, there are infinite points along that line, but for practical reasons, we tend to focus only on the most important, which would be the center point and the extremes of course. If we take the a-axis of this pitchfork and anchor it on the upper extreme of the new abstract vector, we will observe the creation of a new pitchfork that has a steeper angle.

The first thing that grabs our attention is the impression that this new fork is out of sync or out of frequency with price, which it is, so we use the frequency shifting technique to adjust that. When we do that, we immediately realize that this new frequency shifted fork with the a-axis grounded on an abstract vector describes price really well like the previous fork. The duality I want you to notice is that what was considered an unstable mean in the previous fork is now the stable edges in this new fork. That is something that could only be observed in a nonstationary series.

That also tells us a lot about the complexity that underlies the structure of the market. It's always interesting to think about how the economy and all the different participants in the market act like particles or vectors colliding with the main vector of price as if they were objects. All of that is also not just pure theory. We can clearly use that in practical terms in any price action analysis. In fact, it's very important that you attempt to achieve this level where you can really see stuff in the chart that very few other people can see. If you think about the vast majority of traders out there, they have no idea about this relationship between abstract vector spaces, Brownian motion, and this peculiar example of duality that was shown in this lecture.

As I often say, the financial market is a game of information. Whoever has more information faster wins. The goal here is to provide you with the theoretical and practical apparatus so you can access information for your own benefit. Meanwhile, most of the market will be looking for the simple solution that is nothing more than a futile illusion. It always seems close to you, but you will never actually reach it. That's not necessarily a bad thing because it means if you want to succeed, all you have to do is learn a few things that most people don't want to learn our of pure intellectual laziness.