Elementary Stereology For Quantitative Microscopy Prof. Sandeep Sangal Prof. S. Sankaran Department of materials Science and Engineering Department of Metallurgical and materials Engineering Indian Institute of Technology, Kanpur Indian Institute of Technology, Madras

Lecture – 07 Volume Fraction and Particles Size Part - 3

Ok so, we will look at this data set what we have been calculating since morning, I want to bring one point to your attention. Now you see that I have populated the column with what I have done here is it is an individual P p, what I showed in the morning is total average P p.

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There is a small catch here I will I am just going to come there. So, what I have done again is an individual P L this is individual P p and then I have taken the average of that. So, this is what I am getting this average P p and you see that this is an average D in micrometer which I told in the morning right.

So, now when we do this individual P L and individual P p the D I am getting is 87.6 slightly higher than that. So, one of the reason is P p is a random variable, P L is again

random variable each one will follow a distribution. This again this ratio P p by P L will be it will be produce another random variable that will follow a different distribution that is why this difference comes.

I just want to bring into attention we will leave it there, but then to come to this putting our data into this format for example, what we have Professor Sankaran said like we have t distribution as well as we have.

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So, x bar z x bar plus z this. So, like he mentioned we can choose to represent the confidence level in between either t distribution or the z distribution. So, based on that what we have shown here is you can see that the standard deviation is 0.07 for the data of we have collected that is n is equal to 42, what we have calculated.

And then the standard deviation for P p is 0.07 then standard deviation for D is 47.32. And if you look at this confidence level we have arrived at these 2 numbers based on this based on this.

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So, here we have chosen 95 percent of confident interval. So, if you look at that table just we talked about.

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See 95 percent of confidence level you look at this 0.95 and our n is 42 right.

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	18	1.330	1.734	2.101	2.552	2.878	3.197	3.610	3.922	
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	23	1.319	1.714	2.069	2.500	2.807	3.104	3.485	3.768	
	24	1.318	1.711	2.064	2.492	2.797	3.090	3.467	3.745	
	25	1.316	1.708	2.060	2.485	2.787	3.078	3.450	3.725	
	26	1.315	1.706	2.056	2.479	2.779	3.067	3.435	3.707	
	27	1.314	1.703	2.052	2.473	2.771	3.057	3.421	3.690	
	28	1.313	1.701	2.048	2.467	2.763	3.047	3.408	3.674	
	29	1.311	1.699	2.045	2.462	2.756	3.038	3.396	3.659	
	30	1.310	1.697	2.042	2.457	2.750	3.030	3.385	3.646	
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37	1.305	1.687	2.026	2.431	2.715	2.985	3.326	3.574	
38	1.304	1.686	2.024	2.429	2.712	2.980	3.319	3.566	
39	1.304	1.685	2.023	2.426	2.708	2.976	3.313	3.558	
40	1.303	1.684	2.021	2.423	2.704	2.971	3.307	3.551	
42	1.302	1.682	2.018	2.418	2.698	2.963	3.296	3.538	
44	1.301	1.680	2.015	2.414	2.692	2.956	3.286	3.526	
46	1.300	1.679	2.013	2.410	2.687	2.949	3.277	3.515	
48	1.299	1.677	2.011	2.407	2.682	2.943	3.269	3.505	
50	1.299	1.676	2.009	2.403	2.678	2.937	3.261	3.496	
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70	1.294	1.667	1.994	2.381	2.648	2.899	3.211	3.435	
80	1.292	1.664	1.990	2.374	2.639	2.887	3.195	3.416	
90	1.291	1.662	1.987	2.369	2.632	2.878	3.183	3.402	
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So, n minus 1 we have to see. So, we are supposed to see 41, 41 is not there. So, you have 40. So, you take this as a t then we can use that and if you use that into this formula then you get this lower limit and this is higher limit and this is a lower limit and this is higher limit and.

Student: Sir this is for 1.96?

This for 95 percent.

Student: 1.96.

Yeah this, what here it is 1.96.

Student: (Refer Time: 04:10) this for normal distribution.

Yeah, say for z not for t yeah. So, what we are seeing is these 2 measurements again within it comes within this number, what we are seen. And for a t you can substitute instead of 1.96 it could be 2.02. Then you will this interval will be slightly wider, that is what we have said.

So, I think that is what we want to show here in this section about these calculations. Now, what I will do is I will also do that the demo of this Buffon's experiment like the probability. I think for that, I would come there and then that will be displayed here. You can also do a calculation and then see what we get.

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So, what is Buffon's experiment like I am going to throw this it is 10 small sticks with the length of 1.5 mm and I am going to throw this on this sheet which is this lines are separated by about 20 mm.

So, the probability of this small sticks making an intersections in this line is 2 lambda by pi t right. So, that is about 0.477 right. So, what I am going to do is I will do this experiment 5 times, I will take the average and then will see whether that comes to close to what that the theory predicts.

So, I will start my experiment. Now I will start counting 1, 2, 3, 4. So, my first experiment is first event is 4, now I will collect it again.

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Now, I can put 1, 2, I will count again 1, 2 3, 4, 5, 6, 7, this time it is 7. So, you are noting down right?

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So, I will throw third time. Now I will start count 1, 2, 3 and then 4.

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So, I will start again 1, 2, 3, 4, 5, the last event.

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So, 1, 2, 3, 4, so what is the average I am getting?

Student: (Refer Time: 07:47) 4 point sir.

4 point.

Student: 48.

So, that is it.

(Refer Slide Time: 07:59)



So, 24 intersection.

Student: (Refer Time: 08:19) 50.

Out of 50.

Student: 54.

Ha.

Student: 50 throw sir.

Ok.

Student: 10 (Refer Time: 08:26).

Intersections: So what we have is how much you get?

Student: 0 point.

Ok so, what you get by the theory is like 2 lambda by pi t; so it is also 2 into 15 and this is 3.14 into 20 right, this what it is right.

Student: 0.47.

So, this is 0.477; so, that is what it is.

Thank you.