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1	**Question text**
2	The two port model with 9 transfer functions on slide 12, does it depend or change with system conditions?
3	Like any small-signal models, these transfer functions change with operation conditions of the converter in general.
4	
5	how is the performance of frequency/impedance scan in low freq range (e.g. 1-10hz)
6	The low impedance at low frequency may require adjustment of the perturbation to keep the response as "small signal". The frequency resolution may also need to be increased if there is significant variation. Other than these, I cannot think of other factors that may affect the "performance" of scan.
7	
8	In page 8, what does the imaginary part of Y_ap stand for?
9	I'm not sure I understand this question. The imaginary part of Yap is the imaginary part of the admittance. For example, the imaginary part of the admittance of a parallel RC circuit is the admittance of the capacitor.
10	
11	When modeling grid forming is there any difference for converter operating at the limit or not? (slide 22)
12	This largely depends on how the limit is imposed. If the limit is the output of a control function, then that control function is lost when operating at limit and that needs to be considered in modeling. On the other hand, if the limit is placed by an externally provided reference and the reference is treated as constant in small-signal analysis, then it doesn't change the model.
13	
14	How do the off diagonal term values for frequency cross coupling, cross coupling between positive and negative sequence and AC to DC compare to diagonal terms?
15	I'm not sure if I understand the question. As I explained in some of the papers that I cited in the presentation. The coupling at ac port is not a coupling between positive and negative sequence, but rather coupling at different frequencies (shifted by 2 times the fundamental). AC-DC coupling carries a frequency shift of the fundamental. This could be considered a difference between the two types of coupling. One commonality is that both types of coupling diminish as one moves to and above the second harmonic frequency. There are certainly much more to discuss on these two functions - please refer to the papers I cited.
16	
17	Are the positive-negative sequence + DC side 3×3 immitances models equivalent to analysis in the d,q,DC frame? Then why not just using d q, DC
18	The sequence immittance models are fundamentally different from dq-frame models. The fact they may seem to involve the same number of transfer functions is not an indication that they bear any relationship to each other or one can be used in place of the other (although there have been some papers that claimed that.) Also, as I pointed out during the presentation, of the 9 sequence immittance models in the table, only 5 are independent and need to be developed. That's not the case with dq-frame models. Dq-frame models also have other issues, as I mentioned.
19	

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20	How to evaluate stability in coupling frequency of positive and negative sequence?
21	This is one of the topics treated in depth in one of the cited 2-part papers (and in the online course). Please refer to that as it cannot be explained in a few sentences.
22	
23	In the reformulating system model, is it to determine the stability of open-loop function at each node to assess the overall system stability?
24	Open-loop stability of the reformulated model should be guaranteed by assumptions that can be made in general based on practical considerations instead of mathematical calculation. For example, since the grid should be stable before converters are added, the grid impedance matrix Z(s) should have no unstable poles. One shouldn't have to calculate the poles to confirm the open-loop stability assumption. Otherwise the reformaulted model doesn't serve its intended purposes.
25	
26	for the VSG-GFM model, is damper winding modeled in the Q loop?
27	We don't have models for all GFM designs at this point, but in principle any control function can and should be included in the modeling process. The synchronous machine models we developed include all damping windings on the rotor.
28	
29	Can you compute the equivalent Q/V, P/theta from the impedance results? Also, what about the cross-coupling terms: Q/theta or P/V?
30	Yes, each of the transfer functions depends solely on the impedance. As I pointed out in the presentation, they also contain less information than the impedance does and are more sensitive to simulation settings in frequency scan.
31	
32	To Slide 39: Isn‘t the advantage of Q-V that you can say something about the Control bandwith of the GFM functionality? less reaction to high f V
33	No. One can say a lot about control bandwidth by inspecting impedance. Most of that information is lost when one goes to Q-V type response.
34	
35	What are your thoughts on requiring passive admittance (positive resistance) to ensure stability?
36	This is actually part of the grid codes that I have helped several companies to establish, started in 2018 for data center power supplies and now expanding to HVDC. However, it should be pointed out that in most cases, the positive-damping requirement is limited to frequencies above the second harmonic. Below that frequency, negative damping cannot be avoided in general, hence positive damping cannot be a general requirement.
37	
38	Does immitance method can be used for sub synchronous resonance study of the DFIG wind turbine?
39	Yes, and very effectively. It's also very easy to explain based on immittance. I gave some of the explanations on slide 35.
40	
41	You claimed that the coupling terms are needed but then used SISO to analyse the controllers contribution to damping, why/when can you do that?

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42	The models used to explain controller contribution to (negative) damping on slides 28-33 is only the self admittance of the converter. By SISO model we usually refer to the model of a system, which is different from the model of the converter alone. If you are asking why I only examined the self admittance and said nothing about the coupling term, that's mainly because the self admittance is more dominant, hence makes sense to highligh in a short presentation. Also, I probably didn't emphasize it enough during the presentation, but both types of coupling dimishes as one moves up in frequency and can be ignored for analysis above the second harmonic, at least for most practical converters.