

Short-term dynamics in inverter-dominated grids



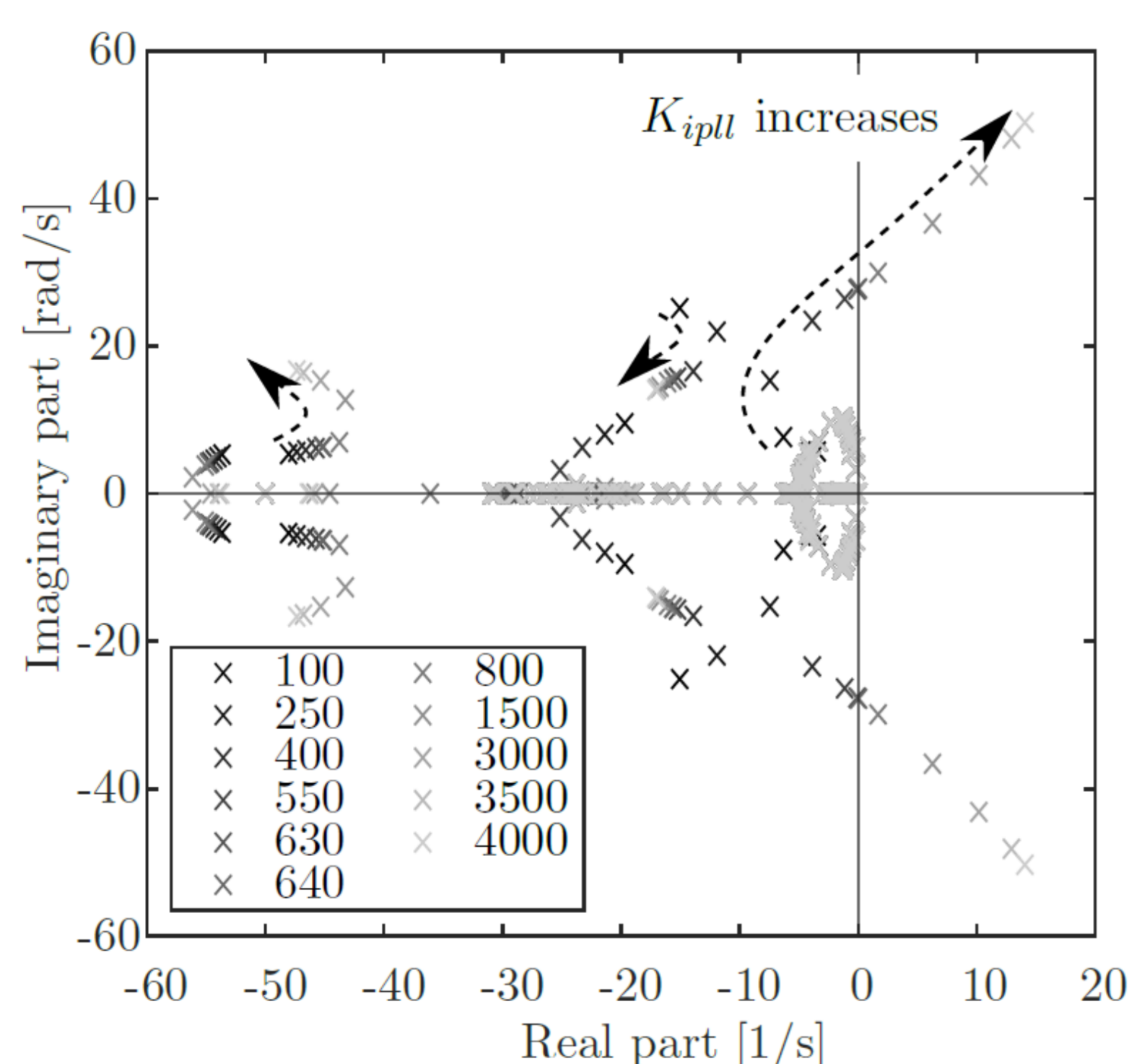
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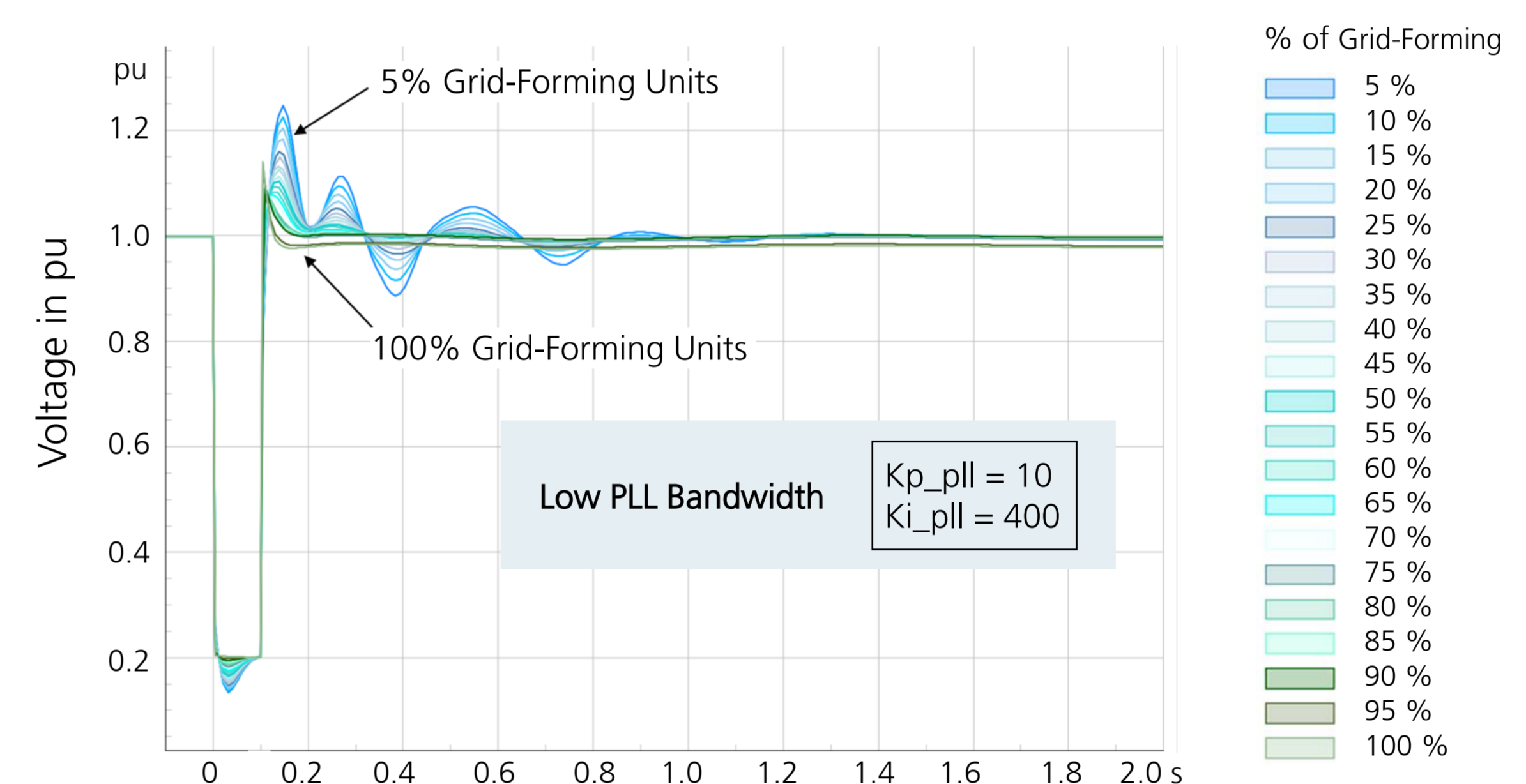
Counteraction of converter-driven oscillations with grid-forming units taking into account PLL bandwidth of existing grid-following inverters

- The PLL dynamics of grid-following units can cause short-term instability in inverter-dominated grids even in the presence of grid-forming units if the PLL bandwidth of existing following units is not properly considered.
- This instability has been classified by the IEEE PSDP committee as slow-interaction converter-driven instability.
- An extended IBG model was implemented in order to capture the phenomenon. The model is inspired by the WECC REGC version C that considers PLL and inner current control dynamics.
- A methodology for the estimation of the required amount of grid-forming units has been proposed.
- The methodology takes into account several variables, including the PLL bandwidth of existing grid-following units.
- A paper is currently under review. "Plausibility and implications of converter-driven oscillations induced by unstable long-term dynamics". IEEE Transactions on Power Systems.

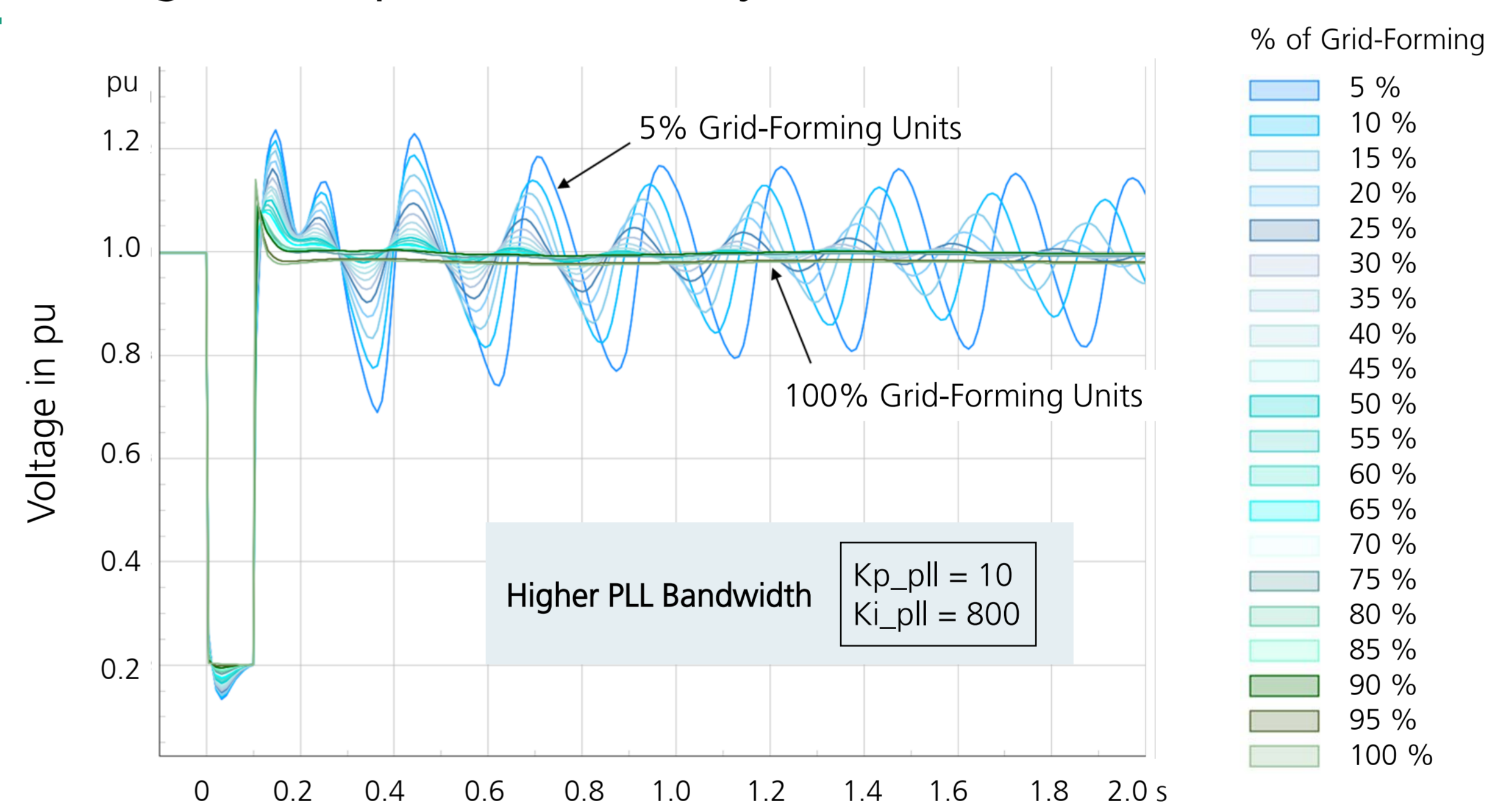
Root-locus with increased PLL bandwidth



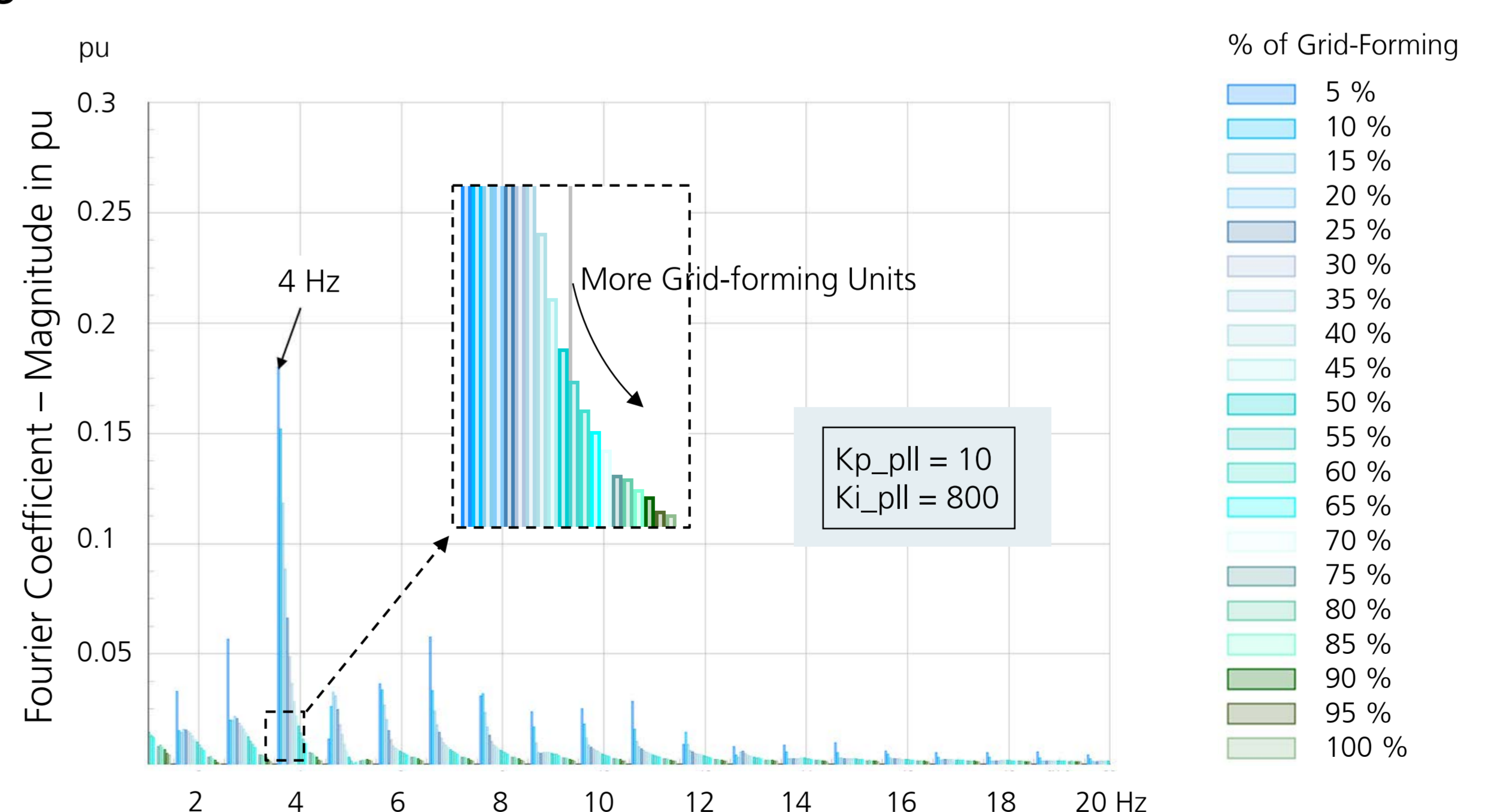
PCC voltage after 3-phase fault nearby the IBGs



PCC voltage after 3-phase fault nearby the IBGs



Higher PLL Bandwidth – FFT



Gefördert durch:



Das diesem Bericht zugrundeliegende Vorhaben wird mit Mitteln des Bundesministeriums für Wirtschaft und Klimaschutz unter den Förderkennzeichen 0350023A-G gefördert. Die Verantwortung für den Inhalt dieser Veröffentlichung liegt bei den Autoren und spiegelt nicht notwendigerweise die Meinung des Projektkonsortiums Netzregelung 2.0 wider.

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