Parallel Session: Proof Theory

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A uniform framework for substructural logics with modalities

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It is well known that context dependent logical rules can be problematic both to implement and reason about. This is one of the factors driving the quest for better behaved, i.e., local, logical systems. This talk will be about such a local system for linear logic (LL) based on linear nested sequents (LNS). Relying on that system, we propose a general framework for modularly describing systems combining, coherently, substructural behaviors inherited from LL with simply dependent multimodalities. This class of systems includes linear, elementary, affine, bounded and subexponential linear logics and extensions of multiplicative additive linear logic (MALL) with normal modalities, as well as general combinations of them. The resulting LNS systems can be adequately encoded into (plain) linear logic, supporting the idea that LL is, in fact, a "universal framework" for the specification of logical systems. From the theoretical point of view, we give a uniform presentation of LL featuring different axioms for its modal operators. From the practical point of view, our results lead to a generic way of constructing theorem provers for different logics, all of them based on the same grounds. This opens the possibility of using the same logical framework for reasoning about all such logical systems. This is a joint work with Carlos Olarte and Björn Lellmann.