# Enough regular Cauchy filters
# for asymmetric uniform and nearness structures

## Anneliese Schauerte *

Quasi-nearness biframes provide an asymmetric setting for the study of nearness; in [1] a completion (called a quasi-completion) was constructed for such structures and in [2] completeness was characterized in terms of the convergence of regular Cauchy bifilters. In this talk, questions of functoriality for this quasi-completion are considered and one sees that having enough regular Cauchy bifilters plays an important rôle.

The quasi-complete strong quasi-nearness biframes with enough regular Cauchy bifilters are seen to form a coreflective subcategory of the strong quasi-nearness biframes with enough regular Cauchy bifilters. Here a significant difference between the symmetric and asymmetric cases emerges: a strong (even quasi-uniform) quasi-nearness biframe need not have enough regular Cauchy bifilters.

The Cauchy filter quotient leads to further characterizations of those quasi-nearness biframes having enough regular Cauchy bifilters. The fact that the Cauchy filter quotient of a totally bounded quasi-nearness biframe is compact shows that any totally bounded quasi-nearness biframe with enough regular Cauchy bifilters is in fact quasi-uniform.

The talk will conclude with various examples and counterexamples illustrating the similarities and differences between the symmetric and asymmetric cases.

REFERENCES

[1] J. Frith and A. Schauerte, *Quasi-nearnesses on biframes and their completions*, Quaestiones Math. 33(4) (2010) 507–530.

[2] J. Frith and A. Schauerte, *Asymmetric filter convergence and completeness*, Quaestiones Math, to appear.

---

*Joint work with John Frith.