

A Tale of Two Dualities

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Abstract. Stably compact spaces enjoy a wonderful mathematical duality, put forward as early as 1948 by Leopoldo Nachbin in his study of compact pospaces, and which we shall call de Groot duality. This has been discovered as particularly relevant to domain theory by A. Jung and others in the 1990s. Let us say that any coherent domain is stably compact, and these include Scott domains, Plotkin's retracts of bifinite domains, and Jung's FS-domains.

Although I never quite stressed it, a running thread of the research I have been conducting in the last few years on modeling mixed non-determinism and probabilistic choice is another, related duality which I called convex-concave duality.

To put it in a mysterious way, the latter says that you may trade good for evil, angels for demons, sups for mins, depending on your point of view.

The point of the talk will be to explain intuitions behind this, how this translates mathematically on several models of mixed non-determinism and probabilistic choice, and how this is used to get two theorems from just one proof, in several instances.