Embeddings of weighted function spaces, and envelopes

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Recently the concept of growth envelopes and continuity envelopes in function spaces was introduced. Basically, the idea is to 'measure' unboundedness and continuity of functions that belong to spaces of Besov or Triebel-Lizorkin type. Growth envelopes, consisting of a growth envelope function

$$\mathcal{E}_{\mathsf{G}}^{X}(t) \ \sim \sup_{\|f|X\|\leq 1} f^{*}(t), \quad t>0,$$

as well as continuity envelopes,

$$\mathcal{E}_{\mathsf{C}}^{X}(t) \ \sim \sup_{\|f|X\|\leq 1} \frac{\omega(f,t)}{t}, \quad t>0,$$

both equipped with some additional fine index $u_{\mathsf{G}} \in (0,\infty]$, and $u_{\mathsf{C}} \in (0,\infty]$, respectively, proved to be reasonable tools in order to characterise spaces.

Closely connected, both as motivation, application, and as method in the proofs, is the study of 'limiting' embeddings. We concentrate in this talk on weighted spaces of type $B^{s}_{p,q}(\mathbb{R}^n,w)$ and $F^{s}_{p,q}(\mathbb{R}^n,w)$, where the weight w is either *locally regular* – like $w(x)=(1+|x|)^{\alpha}$, $\alpha>0$ –, or of Muckenhoupt $\mathcal{A}_p$-type, e.g. $w(x)=|x|^{\alpha}$.

Partly, this is based on joint work with Leszek Skrzypczak.