Interpolation inequalities in spaces of distributions and real analytic functions

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We consider interpolation inequalities of the form
$$\| \cdot \|_2 \leq C \| \cdot \|_1^{\theta} \ \| \cdot \|_3^{1-\theta}, \qquad \theta \in]0, 1[,$$
where $\| \cdot \|_j$ are (semi-)norms and $\theta \in (0, 1)$ in the theory of non-Banach function spaces and their applications to classical analysis. We survey implications of that type of inequalities to the following problems:

- splitting of short exact sequences of locally convex spaces (like spaces of distributions or spaces of real analytic functions);
- parameter dependence of distributional solutions of linear partial differential equations with constant coefficients;
- structure (subspaces, quotient spaces) of the space of real analytic functions.

The talk is based on a joint work with J. Bonet (Valencia).