Unconditional Systems of Spectral Projections — from W. Orlicz to A. Pelczynski and beyond

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In the early 1930's W. Orlicz brought the notion of unconditional convergence into geometry of Hilbert spaces. By the late 50's it became fundamental in both the spectral theory of linear operators and the geometry of Banach and linear topological spaces. A. Pelczynski played the leading role in the latter. I'll make an attempt to overview some of his results and how they influenced other analysts.

The second part of the talk will consider the spectral decompositions of Schroedinger operator with main examples related to Hill operators

$$L = -(d/dx)^2 + v(x), \quad 0 \le x \le \pi,$$

where $v(x) = v(x + 2\pi)$ is a periodic function or a distribution, or the perturbed Harmonic Oscillator operator

$$\ell = -(d/dx)^2 + x^2 + w(x), \quad x \in \mathbb{R}^1,$$

where $w \in L^p(\mathbf{R}^1)$, $1 \le p < \infty$, or is a slowly growing function when $|x|$ goes to ∞.

Results [1] on (unconditional) convergence of spectral decompositions of these non- self-adjoint operators will illustrate how their geometry depends on analytic and combinatorial properties of potentials v and w.

[1]mine or joint with P. Djakov, J. Adduci, P. Siegl, J. Viola.