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Matrix transformations involving analytic sequence spaces

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In *Theorem 3.2* one has to assume that *E is solid*, for in general (b) only implies that there are sequences $\xi^{(1)}, \ldots, \xi^{(m)} \in E$ with $\sup_{x\in B}\left|\sum_{n=0}^{\infty} x_n y_n\right| \leqq \sum_{k=1}^{m}\sum_{n=0}^{\infty} |\xi_n^{(k)}|\,|y_n|$ for $y \in F$, so that if E is solid we may take $\xi = \left(\sum_{k=1}^{m} |\xi_n^{(k)}|\right)_n$.

To give a concrete counter-example, let (q_n) be an enumeration of $\mathbb{Q}$, and let $x=(1,0,1,0,1,\ldots)$ and $y=(q_1,1,q_2,1,q_3,\ldots)$. We put $E=\varphi\oplus\langle\{x,y\}\rangle$ and $F=E^{\times}$. The solid span $|E|$ of E is a diagonal transform of l^{∞}, so that $F=|E|^{\times}$ is a diagonal transform of l^1 and $(F, \nu(F,E))=(F,\nu(F,|E|))$ is barrelled. But we show that $(E,\sigma(E,F))$ is not simple. Else there would exist scalars α and β and some $z\in\varphi$ such that $|x_n| \leqq |z_n+\alpha x_n+\beta y_n|$ and $|y_n| \leqq |z_n+\alpha x_n+\beta y_n|$ for $n\in\mathbb{N}_0$. This implies that $\beta \neq 0$, so that we can find a sequence (n_k) with $\alpha+\beta q_{n_k}\to 0$, while we have $|x_{2n}|=1$ for $n\in\mathbb{N}_0$. This is a contradiction.

As a consequence, in *Theorem 6.1(1)* and *Theorem 6.2* one also has to assume that *E is solid.*