

Tensor series in Banach spaces

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A classical theorem of Grothendieck [1] asserts that every element u of the completed projective tensor product $X \hat{\otimes}_{\pi} Y$ of two Banach (or Fréchet) spaces can be represented as a tensor series

$$u = \sum_{n=1}^{\infty} x_n \otimes y_n.$$

This is proved in virtually every text about tensor products of Banach spaces which, on the other hand, all remain silent about the corresponding question for the injective tensor product. R.A. Ryan even claims in his well known book [2] that *there is no general representation of the elements of the completed tensor product $X \hat{\otimes}_{\varepsilon} Y$.* This claim is the main topic of the talk.

References

- [1] Grothendieck, A., Produits Tensoriels Topologiques et Espaces Nucléaire, *Memoirs of the American Mathematical Society*, **16** (1955).
- [2] Ryan, R.A., Introduction to Tensor Products of Banach Spaces, *Springer Monographs in Mathematics*, (2002).
