THE FIELDS INSTITUTE
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ABSTRACTS 1.2

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ℓ^1-spreading models in mixed Tsirelson spaces

Joint work with Wee Kee Tang We consider the problem of determining the existence of higher order ℓ^1-spreading models in mixed Tsirelson spaces. Let (θ_n) be a nonincreasing null sequence in $(0,1)$ such that $\theta_{m+n} \geq \theta_m\theta_n$ for all m, n. Argyros, Deliyanni and Manoussakis proved that if $\lim \theta_n^{1/n} = 1$, then every block subspace of $T[(\theta_n, \mathcal{S}_n)_{n=1}^\infty]$ contains an ℓ^1-$\mathcal{S}_\omega$-spreading model. We have the following results.

1. The mixed Tsirelson space $T[(\theta_n, \mathcal{S}_n)_{n=1}^\infty]$ contains an ℓ^1-$\mathcal{S}_\omega$- spreading model if and only if $\lim_n \limsup_m \theta_{m+n}/\theta_m > 0$.
2. Let X be a block subspace of the mixed Tsirelson space $T[(\theta_n, \mathcal{S}_n)_{n=1}^\infty]$. The following are equivalent.
   (a) The Bourgain ℓ^1-index of X is $\omega^{\omega \cdot 2}$.
   (b) X contains an ℓ^1-$\mathcal{S}_\omega$- spreading model.
   (c) Every normalized block sequence in X has a further normalized block (x_n) that is equivalent to the sequence (e_{k_n}). Here (e_k) is the unit vector basis of $T[(\theta_n, \mathcal{S}_n)_{n=1}^\infty]$ and $k_n = \max \operatorname{supp} x_n$.

   Moreover, if every block subspace X has the equivalent properties above, then $T[(\theta_n, \mathcal{S}_n)_{n=1}^\infty]$ is arbitrarily distortable.

Note that the result of Argyros et al. can be deduced from (2).