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Crossings and Nestings of Chord Configurations

Put $2n$ points on a circle, then join them in pairs by n chords. It is well known that the number of non-crossing configurations is $\frac{1}{n+1}\binom{2n}{n}$, the n-th Catalan number. A natural extension is to enumerate all configurations by the number of crossings of the chords, and it is proved that the distribution of number of crossings is identical to that of *nestings*. In this talk we extend the above result. We introduce the notion of *crossing number* and *nesting number* for a chord-configuration, and prove that these two statistics are distributed symmetrically over all chord configurations. A similar result also holds over all set partitions.