Completions of Pseudo-Ordered Sets

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A *pseudo-ordered set* (X, R) is a set X with a binary relation R that is reflexive and anti-symmetric. If the relation R is additionally transitive, we say it is a partially ordered set. Examples of pseudo-ordered sets include tournaments.

In 1971 Skala proved that every pseudo-ordered set can be embedded into a complete pseudo-ordered set, that is, into a pseudo-ordered set where each subset has a greatest lower bound and a least upper bound. However, Skala's completion is complex, and lacks many desirable properties. For example, when applied to a complete partially ordered set it can produce a result that is not partially ordered.

We give a new completion that is similar to the usual completion by cuts used to produce the extended reals from the rationals.