On the Relationship Between Probabilistic Circuits and Determinantal Point Processes

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PCs and DPPs

We cannot tractably represent DPPs with subclasses of PCs
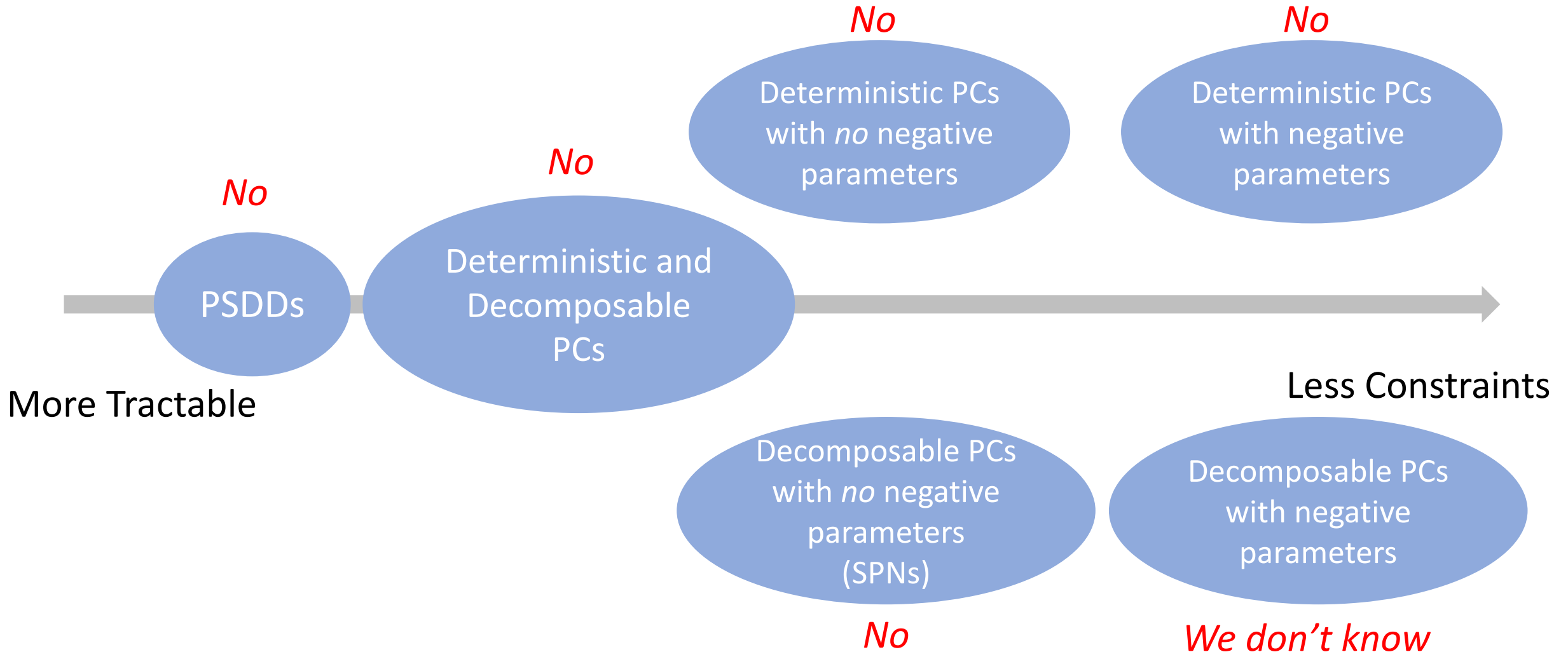
Negative Results

Theorem 1. *For a DPP with kernel $L = B^T B$, where B is randomly generated,* with probability 1, *this DPP cannot be represented by polynomial-size PSDDs.*

Theorem 2. *There exists a class of DPPs that cannot be tractably represented by deterministic PCs with (possibly)* negative parameters.

Theorem 3. *There exists a class of DPPs that cannot be tractably represented by PCs with* non-negative parameters *(SPNs).*