Examples for pctex

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‘pctex‘ provides some useful commands for working with probabilistic circuits. The main purpose of this is reusability and harmonization of notation.

1 General/Misc

- Log-sum-exp: $\mathrm{L}\sum_{i=1}^{k}\mathrm{E}$: `$\lse{i=1}{k}$`
- $\mathtt{poly}(N)$: `$\poly{N}$`

2 General graphs

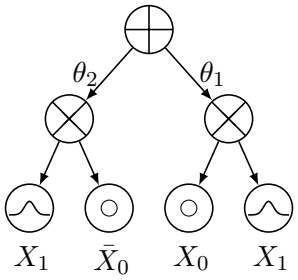
- Graph $\mathcal{G}$: `$\graph$`
- Walk $\mathcal{W}$: `$\walk$`
- Tree $\mathcal{T}$: `$\tree$`
- Vertex set $\mathrm{V}(\mathcal{G})$: `$\vset(\graph)$`
- Edge set $\mathrm{E}(\mathcal{G})$: `$\eset(\graph)$`
- Node/nodes $\mathsf{N}, \mathbf{N}$: `$\node$`
- Child/children: $\mathsf{C}, \mathbf{C}$: `$\child$`
- Children of a node: $\mathrm{ch}(\mathsf{N})$: `$\ch{\node}$`
- Parents of a node: $\mathrm{par}(\mathsf{N})$: `$\pa{\node}$`
- Neighbours: $\mathrm{neigh}(\mathsf{N})$: `$\neigh{\node}$`

3 Probabilistic Circuits

- Probabilistic circuit: $\mathcal{C}$: `$\pc$`
- Scope function: $\psi(\mathsf{N})$: `$\scope{\node}$`
- v-tree: $\mathcal{V}$: `$\vtree$`
- Sum node/nodes: $\mathsf{S}, \mathbf{S}$: `$\snode, \snodes$`
- Product node/nodes: $\mathsf{P}, \mathbf{P}$: `$\pnode, \pnodes$`
- Leaf node/nodes: $\mathsf{L}, \mathbf{L}$: `$\lnode, \lnodes$`
- Region/regions: $\mathsf{R}, \mathbf{R}$: `$\region, \regions$`
- Partition/partitions: $\mathsf{P}, \mathbf{P}$: `$\partition, \partitions$`
- Region-graph: $\mathcal{R}$: `$\rg$`

4 Tikz / Plotting

Plotting is based on an adaptation of 'tikzlibraryspn.code.tex' by Nicola Di Mauro and Antonio Vergari.



Code for the figure above:

```
\begin{tikzpicture}

\sumnode{s1};
\prodnode[below=15pt of s1, xshift=30pt]{p1};
\prodnode[below=15pt of s1, xshift=-30pt]{p2};

\bernode[below=15pt of p1, xshift=-15pt]{v1}{$X_0$};
```

```
\bernode[below=15pt of p2, xshift=15pt]{v2}{$\bar{X}_0$};

\contnode[below=15pt of p1, xshift=15pt]{v3}{$X_1$};
\contnode[below=15pt of p2, xshift=-15pt]{v4}{$X_1$};

\weigedge[right] {s1} {p1} {$\theta_1$};
\weigedge[left] {s1} {p2} {$\theta_2$};

\edge {p1} {v1};
\edge {p2} {v2};
\edge {p1} {v3};
\edge {p2} {v4};

\end{tikzpicture}
```