Probabilistic Automata:
We tried and we tried
and we implied and we applied
and still we could not decide!

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Probabilistic Automata: We tried and we tried and we implied.
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Early results

- The emptiness problem is undecidable;
- If $\lambda$ is isolated in $A$, $L^\lambda_A$ is regular;
- The isolation problem is undecidable for $0 < \lambda < 1$;
- The approximation problem is undecidable.
Recent results

- The isolation problem is undecidable for $\lambda = 0$ and $\lambda = 1$;
- Decidable classes: \$\#\$-acyclic $\subsetneq$ structurally simple $\subsetneq$ leaktight.
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Open problems

- Numberless probabilistic automata;
- What does the saturation algorithm compute?
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Probabilistic Automata

Our work

\[ q \xrightarrow{a \cdot 0.5} p \xrightarrow{a \cdot 0.5} r \]

\[ p \xrightarrow{a} (q/r) \xrightarrow{q/r} 1 \]

\[ q \xrightarrow{q/r} 1 \]

\[ r \xrightarrow{q/r} 2 \]

\[ 1 - 2x \]

control
Results

- Probabilistic automata with one transition are undecidable;
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- Corollary: Numberless Automata are undecidable;
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- Probabilistic automata with one transition are undecidable;
- Corollary: Numberless Automata are undecidable;
- Conjecture: This is not the algorithm you are looking for.