

CalcCircuitGenerator

```
SetDirectory @ NotebookDirectory[];
Import["../Link/QuESTlink.m"];

test[in_] := Module[
  {out, inMatr, check, error},
  (* Note: 'in' must target lowest-index qubits, because the
    Pauli strings returned by CalcCircuitGenerator[] may correctly
    contain Id0 despite 0 being un-targeted by the gates. This
    makes CalcCircuitMatrix return different dimensional objects etc
  *)
  out = CalcCircuitGenerator[in];
  check = MatrixExp[  $\frac{i}{2}$  CalcPauliExpressionMatrix[out] ];
  inMatr = CalcCircuitMatrix @ First @ GetCircuitCompacted @ in;
  error = inMatr - check // N // Abs // Chop // Max // Simplify // Chop;
  Echo[out, "output: "];
  Echo[error, "error: "];
  If[error != 0, Style["ERRONEOUS GENERATOR!", Red]]]
```

Doc

? CalcCircuitGenerator

Symbol

CalcCircuitGenerator[circuit] computes the Pauli

string generator G of the given circuit, whereby circuit = Exp[i G].

- If circuit contains decoherence operators, the generator of the circuit's superoperator is returned. See ?GetCircuitSuperoperator.
- If circuit is unitary, the resulting coefficients may have non-zero imaginary components due to numerical error; these can be removed with Chop[].
- If circuit is a single operator, the resulting Pauli string is automatically simplified.
- Accepts option TransformationFunction -> f, where function f will be applied to the generator's Z-basis matrix before projection into the Pauli basis. This overrides the automatic simplification.

Tests

Numerical

```
test @ U0 @ RandomVariate @ CircularUnitaryMatrixDistribution @ 2
```

» output: $(-0.642941 + 3.26562 \times 10^{-16} i) \text{Id}_0 + (0.484959 + 5.55112 \times 10^{-17} i) X_0 -$
 $(0.458753 + 1.11022 \times 10^{-16} i) Y_0 + (0.0876569 - 7.50268 \times 10^{-17} i) Z_0$

» error: 0

(* because input is unitary, output can be chopped to reveal all-real *)

Chop @ CalcCircuitGenerator @

U_0 @ RandomVariate @ CircularUnitaryMatrixDistribution @ 2

$-1.47244 \text{Id}_0 + 0.914053 X_0 + 1.08233 Y_0 - 0.61343 Z_0$

test @ $U_{0,1,2}$ @ RandomVariate @ CircularUnitaryMatrixDistribution @ 8

» output: $(0.138101 + 2.24647 \times 10^{-16} i) \text{Id}_2 - (0.24979 - 1.83881 \times 10^{-16} i) X_0 +$
 $(0.0085917 + 3.67761 \times 10^{-16} i) X_1 + (0.24019 + 1.52656 \times 10^{-16} i) X_0 X_1 +$
 $(0.152793 - 2.22045 \times 10^{-16} i) X_2 - (0.162138 - 6.76542 \times 10^{-17} i) X_0 X_2 +$
 $(0.0657346 + 1.52656 \times 10^{-16} i) X_1 X_2 - (0.0173216 + 2.35922 \times 10^{-16} i) X_0 X_1 X_2 +$
 $(0.0226546 - 1.73472 \times 10^{-16} i) Y_0 + (0.202542 - 1.31839 \times 10^{-16} i) X_1 Y_0 -$
 $(0.159337 + 1.66533 \times 10^{-16} i) X_2 Y_0 - (0.24499 + 5.20417 \times 10^{-17} i) X_1 X_2 Y_0 -$
 $(0.20209 + 1.49186 \times 10^{-16} i) Y_1 - (0.0954031 + 0. i) X_0 Y_1 -$
 $(0.219868 - 6.93889 \times 10^{-17} i) X_2 Y_1 - (0.314749 - 3.46945 \times 10^{-18} i) X_0 X_2 Y_1 -$
 $(0.0593108 - 2.08167 \times 10^{-16} i) Y_0 Y_1 + (0.192119 + 2.63678 \times 10^{-16} i) X_2 Y_0 Y_1 +$
 $(0.119025 + 2.77556 \times 10^{-16} i) Y_2 + (0.145875 - 2.77556 \times 10^{-16} i) X_0 Y_2 -$
 $(0.357975 + 1.38778 \times 10^{-17} i) X_1 Y_2 + (0.0158068 - 7.97973 \times 10^{-17} i) X_0 X_1 Y_2 +$
 $(0.312147 - 2.60209 \times 10^{-17} i) Y_0 Y_2 + (0.282815 + 2.08167 \times 10^{-16} i) X_1 Y_0 Y_2 +$
 $(0.0832061 + 2.08167 \times 10^{-16} i) Y_1 Y_2 - (0.455289 - 2.08167 \times 10^{-16} i) X_0 Y_1 Y_2 +$
 $(0.281424 + 2.32453 \times 10^{-16} i) Y_0 Y_1 Y_2 + (0.296709 + 4.42354 \times 10^{-17} i) Z_0 -$
 $(0.194716 + 9.02056 \times 10^{-17} i) X_1 Z_0 + (0.222757 + 1.11022 \times 10^{-16} i) X_2 Z_0 -$
 $(0.0162767 + 9.71445 \times 10^{-17} i) X_1 X_2 Z_0 + (0.161143 + 3.1225 \times 10^{-17} i) Y_1 Z_0 -$
 $(0.00621457 + 1.21431 \times 10^{-16} i) X_2 Y_1 Z_0 + (0.24448 + 1.249 \times 10^{-16} i) Y_2 Z_0 +$
 $(0.174157 - 2.70617 \times 10^{-16} i) X_1 Y_2 Z_0 - (0.0293672 - 4.30211 \times 10^{-16} i) Y_1 Y_2 Z_0 +$
 $(0.154474 - 9.62772 \times 10^{-17} i) Z_1 + (0.162572 - 6.93889 \times 10^{-17} i) X_0 Z_1 -$
 $(0.304894 + 2.77556 \times 10^{-17} i) X_2 Z_1 + (0.00157098 + 8.50015 \times 10^{-17} i) X_0 X_2 Z_1 +$
 $(0.0618603 - 1.45717 \times 10^{-16} i) Y_0 Z_1 + (0.255173 + 2.77556 \times 10^{-16} i) X_2 Y_0 Z_1 +$
 $(0.766275 + 2.77556 \times 10^{-16} i) Y_2 Z_1 - (0.145183 + 5.55112 \times 10^{-17} i) X_0 Y_2 Z_1 -$
 $(0.169133 + 4.33681 \times 10^{-17} i) Y_0 Y_2 Z_1 + (0.107994 + 2.86229 \times 10^{-17} i) Z_0 Z_1 -$
 $(0.558454 + 4.44089 \times 10^{-16} i) X_2 Z_0 Z_1 - (0.095023 + 2.08167 \times 10^{-16} i) Y_2 Z_0 Z_1 -$
 $(0.249518 + 1.20563 \times 10^{-16} i) Z_2 + (0.0909317 + 6.59195 \times 10^{-17} i) X_0 Z_2 +$
 $(0.0106539 + 2.15106 \times 10^{-16} i) X_1 Z_2 - (0.0899607 + 2.91434 \times 10^{-16} i) X_0 X_1 Z_2 +$
 $(0.0250677 - 1.73472 \times 10^{-16} i) Y_0 Z_2 - (0.120686 - 6.93889 \times 10^{-18} i) X_1 Y_0 Z_2 -$
 $(0.15428 + 4.51028 \times 10^{-17} i) Y_1 Z_2 + (0.315067 + 1.38778 \times 10^{-16} i) X_0 Y_1 Z_2 -$
 $(0.0079498 + 2.22045 \times 10^{-16} i) Y_0 Y_1 Z_2 + (0.166603 - 7.89299 \times 10^{-17} i) Z_0 Z_2 -$
 $(0.0425243 - 6.245 \times 10^{-17} i) X_1 Z_0 Z_2 + (0.284662 - 3.1225 \times 10^{-17} i) Y_1 Z_0 Z_2 +$
 $(0.185936 - 2.02095 \times 10^{-16} i) Z_1 Z_2 + (0.0792724 + 2.63678 \times 10^{-16} i) X_0 Z_1 Z_2 +$
 $(0.1775 + 1.8735 \times 10^{-16} i) Y_0 Z_1 Z_2 - (0.620373 - 2.00361 \times 10^{-16} i) Z_0 Z_1 Z_2$

» error: 0

Automatic simplification

(* non-unitary, so coefficients are complex *)

test @ Fac[x]

» output: $-i \operatorname{Log}[x] \operatorname{Id}_0$

» error: 0

(* below are unitary, so coefficients are real *)

test @ G[x]

» output: $x \operatorname{Id}_0$

» error: 0

test @ H₀

» output: $\frac{\pi \operatorname{Id}_0}{2} - \frac{\pi X_0}{2\sqrt{2}} - \frac{\pi Z_0}{2\sqrt{2}}$

» error: 0

CalcCircuitGenerator @ Id₀

0

test @ C₂@Ph_{0,1}[x]

» output: $\frac{x \operatorname{Id}_2}{8} - \frac{x Z_0}{8} - \frac{x Z_1}{8} + \frac{1}{8} x Z_0 Z_1 - \frac{x Z_2}{8} + \frac{1}{8} x Z_0 Z_2 + \frac{1}{8} x Z_1 Z_2 - \frac{1}{8} x Z_0 Z_1 Z_2$

» error: 0

test @ R[x, X₀ Y₁ Z₂]

» output: $-\frac{1}{2} x X_0 Y_1 Z_2$

» error: 0

test @ C_{3,4}@R[x, X₀ Y₁ Z₂]

» output: $-\frac{1}{8} x X_0 Y_1 Z_2 + \frac{1}{8} x X_0 Y_1 Z_2 Z_3 + \frac{1}{8} x X_0 Y_1 Z_2 Z_4 - \frac{1}{8} x X_0 Y_1 Z_2 Z_3 Z_4$

» error: 0

test @ Rx₀[x]

» output: $-\frac{x X_0}{2}$

» error: 0

test @ C_{1,2}@Ry₀[x]

» output: $-\frac{x Y_0}{8} + \frac{1}{8} x Y_0 Z_1 + \frac{1}{8} x Y_0 Z_2 - \frac{1}{8} x Y_0 Z_1 Z_2$

» error: 0

test @ C_{1,3}@Rz_{0,2}[x]

» output: $-\frac{1}{8} \times Z_0 Z_2 + \frac{1}{8} \times Z_0 Z_1 Z_2 + \frac{1}{8} \times Z_0 Z_2 Z_3 - \frac{1}{8} \times Z_0 Z_1 Z_2 Z_3$

» error: 0

test @ T_0

» output: $\frac{\pi \text{Id}_0}{8} - \frac{\pi Z_0}{8}$

» error: 0

test @ S_0

» output: $\frac{\pi \text{Id}_0}{4} - \frac{\pi Z_0}{4}$

» error: 0

test @ $\text{SWAP}_{0,1}$

» output: $\frac{\pi \text{Id}_1}{4} - \frac{1}{4} \pi X_0 X_1 - \frac{1}{4} \pi Y_0 Y_1 - \frac{1}{4} \pi Z_0 Z_1$

» error: 0

test @ X_0

» output: $\frac{\pi \text{Id}_0}{2} - \frac{\pi X_0}{2}$

» error: 0

test @ Y_0

» output: $\frac{\pi \text{Id}_0}{2} - \frac{\pi Y_0}{2}$

» error: 0

test @ Z_0

» output: $\frac{\pi \text{Id}_0}{2} - \frac{\pi Z_0}{2}$

» error: 0

Superoperators

(* non-unitary, so coefficients are complex *)

test @ $\text{Damp}_0[x]$

» output: $\frac{1}{4} \left(-2 \text{Log}[\sqrt{1-x}] - \text{Log}[1-x] \right) \text{Id}_1 +$
 $\frac{1}{4} \text{Log}[1-x] X_0 X_1 - \frac{1}{4} \text{Log}[1-x] X_1 Y_0 - \frac{1}{4} \text{Log}[1-x] X_0 Y_1 - \frac{1}{4} \text{Log}[1-x] Y_0 Y_1 +$
 $\frac{1}{4} \text{Log}[1-x] Z_0 + \frac{1}{4} \text{Log}[1-x] Z_1 + \frac{1}{4} \left(2 \text{Log}[\sqrt{1-x}] - \text{Log}[1-x] \right) Z_0 Z_1$

» error: 0

test @ $\text{Deph}_0[x]$

» output: $-\frac{1}{2} \text{ i } \text{Log}[1 - 2x] \text{ Id}_1 + \frac{1}{2} \text{ i } \text{Log}[1 - 2x] Z_0 Z_1$

» error: 0

test @ Deph_{0,1}[x]

» output:

$$-\frac{3}{4} \text{ i } \text{Log}\left[1 - \frac{4x}{3}\right] \text{ Id}_3 + \frac{1}{4} \text{ i } \text{Log}\left[1 - \frac{4x}{3}\right] Z_0 Z_2 + \frac{1}{4} \text{ i } \text{Log}\left[1 - \frac{4x}{3}\right] Z_1 Z_3 + \frac{1}{4} \text{ i } \text{Log}\left[1 - \frac{4x}{3}\right] Z_0 Z_1 Z_2 Z_3$$

» error: 0

test @ Depol₀[x]

» output:

$$-\frac{3}{4} \text{ i } \text{Log}\left[1 - \frac{4x}{3}\right] \text{ Id}_1 + \frac{1}{4} \text{ i } \text{Log}\left[1 - \frac{4x}{3}\right] X_0 X_1 - \frac{1}{4} \text{ i } \text{Log}\left[1 - \frac{4x}{3}\right] Y_0 Y_1 + \frac{1}{4} \text{ i } \text{Log}\left[1 - \frac{4x}{3}\right] Z_0 Z_1$$

» error: 0

test @ Depol_{0,1}[x]

» output: $-\frac{15}{16} \text{ i } \text{Log}\left[1 - \frac{16x}{15}\right] \text{ Id}_3 + \frac{1}{16} \text{ i } \text{Log}\left[1 - \frac{16x}{15}\right] X_0 X_2 +$

$$\frac{1}{16} \text{ i } \text{Log}\left[1 - \frac{16x}{15}\right] X_1 X_3 + \frac{1}{16} \text{ i } \text{Log}\left[1 - \frac{16x}{15}\right] X_0 X_1 X_2 X_3 - \frac{1}{16} \text{ i } \text{Log}\left[1 - \frac{16x}{15}\right] Y_0 Y_2 -$$

$$\frac{1}{16} \text{ i } \text{Log}\left[1 - \frac{16x}{15}\right] X_1 X_3 Y_0 Y_2 - \frac{1}{16} \text{ i } \text{Log}\left[1 - \frac{16x}{15}\right] Y_1 Y_3 - \frac{1}{16} \text{ i } \text{Log}\left[1 - \frac{16x}{15}\right] X_0 X_2 Y_1 Y_3 +$$

$$\frac{1}{16} \text{ i } \text{Log}\left[1 - \frac{16x}{15}\right] Y_0 Y_1 Y_2 Y_3 + \frac{1}{16} \text{ i } \text{Log}\left[1 - \frac{16x}{15}\right] Z_0 Z_2 + \frac{1}{16} \text{ i } \text{Log}\left[1 - \frac{16x}{15}\right] X_1 X_3 Z_0 Z_2 -$$

$$\frac{1}{16} \text{ i } \text{Log}\left[1 - \frac{16x}{15}\right] Y_1 Y_3 Z_0 Z_2 + \frac{1}{16} \text{ i } \text{Log}\left[1 - \frac{16x}{15}\right] Z_1 Z_3 + \frac{1}{16} \text{ i } \text{Log}\left[1 - \frac{16x}{15}\right] X_0 X_2 Z_1 Z_3 -$$

$$\frac{1}{16} \text{ i } \text{Log}\left[1 - \frac{16x}{15}\right] Y_0 Y_2 Z_1 Z_3 + \frac{1}{16} \text{ i } \text{Log}\left[1 - \frac{16x}{15}\right] Z_0 Z_1 Z_2 Z_3$$

» error: 0

test @ Kraus₀@ $\left\{ \begin{pmatrix} 1 & 0 \\ 0 & \sqrt{1-x} \end{pmatrix}, \begin{pmatrix} 0 & \sqrt{x} \\ 0 & 0 \end{pmatrix} \right\}$

» output:
$$\frac{1}{4} \left(-i \operatorname{Log}[\sqrt{1-x}] - i \operatorname{Log}[\operatorname{Conjugate}[\sqrt{1-x}]] - i \operatorname{Log}[\sqrt{1-x} \operatorname{Conjugate}[\sqrt{1-x}]] \right) \operatorname{Id}_1 -$$

$$\frac{i \sqrt{x} \operatorname{Conjugate}[\sqrt{x}] \operatorname{Log}[\sqrt{1-x} \operatorname{Conjugate}[\sqrt{1-x}]] X_0 X_1}{4 \left(-1 + \sqrt{1-x} \operatorname{Conjugate}[\sqrt{1-x}] \right)} +$$

$$\frac{\sqrt{x} \operatorname{Conjugate}[\sqrt{x}] \operatorname{Log}[\sqrt{1-x} \operatorname{Conjugate}[\sqrt{1-x}]] X_1 Y_0}{4 \left(-1 + \sqrt{1-x} \operatorname{Conjugate}[\sqrt{1-x}] \right)} +$$

$$\frac{\sqrt{x} \operatorname{Conjugate}[\sqrt{x}] \operatorname{Log}[\sqrt{1-x} \operatorname{Conjugate}[\sqrt{1-x}]] X_0 Y_1}{4 \left(-1 + \sqrt{1-x} \operatorname{Conjugate}[\sqrt{1-x}] \right)} +$$

$$\frac{i \sqrt{x} \operatorname{Conjugate}[\sqrt{x}] \operatorname{Log}[\sqrt{1-x} \operatorname{Conjugate}[\sqrt{1-x}]] Y_0 Y_1}{4 \left(-1 + \sqrt{1-x} \operatorname{Conjugate}[\sqrt{1-x}] \right)} +$$

$$\frac{1}{4} \left(i \operatorname{Log}[\sqrt{1-x}] - i \operatorname{Log}[\operatorname{Conjugate}[\sqrt{1-x}]] + i \operatorname{Log}[\sqrt{1-x} \operatorname{Conjugate}[\sqrt{1-x}]] \right) Z_0 +$$

$$\frac{1}{4} \left(-i \operatorname{Log}[\sqrt{1-x}] + i \operatorname{Log}[\operatorname{Conjugate}[\sqrt{1-x}]] + i \operatorname{Log}[\sqrt{1-x} \operatorname{Conjugate}[\sqrt{1-x}]] \right) Z_1 +$$

$$\frac{1}{4} \left(i \operatorname{Log}[\sqrt{1-x}] + i \operatorname{Log}[\operatorname{Conjugate}[\sqrt{1-x}]] - i \operatorname{Log}[\sqrt{1-x} \operatorname{Conjugate}[\sqrt{1-x}]] \right) Z_0 Z_1$$

» error: 0

```
test @ Kraus0 @ Table[
  RandomVariate @ CircularUnitaryMatrixDistribution @ 2,
  10
]
```

» output:
$$\left(2.22045 \times 10^{-16} - 1.22889 i \right) \operatorname{Id}_1 + \left(0.683561 + 2.77556 \times 10^{-17} i \right) X_0 -$$

$$\left(0.683561 + 4.44089 \times 10^{-16} i \right) X_1 + \left(6.80012 \times 10^{-16} + 0.00974008 i \right) X_0 X_1 -$$

$$\left(0.52452 - 3.88578 \times 10^{-16} i \right) Y_0 + \left(3.88578 \times 10^{-16} + 0.239698 i \right) X_1 Y_0 -$$

$$\left(0.52452 - 4.71845 \times 10^{-16} i \right) Y_1 - \left(4.996 \times 10^{-16} + 0.239698 i \right) X_0 Y_1 +$$

$$\left(4.30211 \times 10^{-16} + 0.572184 i \right) Y_0 Y_1 - \left(0.713183 + 2.77556 \times 10^{-16} i \right) Z_0 -$$

$$\left(4.16334 \times 10^{-16} + 0.0964128 i \right) X_1 Z_0 - \left(2.77556 \times 10^{-16} + 0.0368746 i \right) Y_1 Z_0 +$$

$$\left(0.713183 - 7.21645 \times 10^{-16} i \right) Z_1 + \left(1.66533 \times 10^{-16} - 0.0964128 i \right) X_0 Z_1 -$$

$$\left(8.32667 \times 10^{-17} - 0.0368746 i \right) Y_0 Z_1 - \left(4.44089 \times 10^{-16} + 0.511249 i \right) Z_0 Z_1$$

» error: 0

```
test @ Kraus0,1 @ Table[
  RandomVariate @ CircularUnitaryMatrixDistribution @ 4,
  10
]
```

» output:
$$\left(0.392699 - 0.788204 i \right) \operatorname{Id}_3 + \left(0.0967006 - 0.125715 i \right) X_0 +$$

$$\left(0.184379 - 0.0999634 i \right) X_1 + \left(0.0278612 - 0.000200521 i \right) X_0 X_1 -$$

$$\left(0.113723 - 0.301317 i \right) X_2 + \left(0.0844504 - 0.107149 i \right) X_0 X_2 + \left(0.0837353 - 0.106058 i \right) X_1 X_2 +$$

$$\left(0.0933613 - 0.0434643 i \right) X_0 X_1 X_2 - \left(0.301648 - 0.140564 i \right) X_3 + \left(0.121154 + 0.152919 i \right) X_0 X_3 +$$

$$\left(0.0480035 - 0.112296 i \right) X_1 X_3 - \left(0.164283 + 0.187907 i \right) X_0 X_1 X_3 +$$

$$\left(0.079254 + 0.110027 i \right) X_2 X_3 - \left(0.250685 + 0.000667873 i \right) X_0 X_2 X_3 +$$

$$\left(0.159561 + 0.00148002 i \right) X_1 X_2 X_3 + \left(0.0142665 - 0.20248 i \right) X_0 X_1 X_2 X_3 +$$

$$\left(0.388671 - 0.125209 i \right) Y_0 - \left(0.219879 + 0.0970196 i \right) X_1 Y_0 - \left(0.0308771 + 0.126308 i \right) X_2 Y_0 -$$

$$\begin{aligned}
& (0.104775 - 0.194904 i) X_1 X_2 Y_0 + (0.0194429 - 0.090986 i) X_3 Y_0 + \\
& (0.319897 + 0.26307 i) X_1 X_3 Y_0 + (0.207589 + 0.0372499 i) X_2 X_3 Y_0 + \\
& (0.0491627 + 0.0847181 i) X_1 X_2 X_3 Y_0 + (0.149215 - 0.146117 i) Y_1 + \\
& (0.0730206 + 0.0817739 i) X_0 Y_1 - (0.0619015 + 0.0628647 i) X_2 Y_1 + \\
& (0.0291738 + 0.182245 i) X_0 X_2 Y_1 + (0.0334577 + 0.126527 i) X_3 Y_1 + \\
& (0.085266 + 0.210388 i) X_0 X_3 Y_1 - (0.109239 - 0.0896142 i) X_2 X_3 Y_1 - \\
& (0.0603119 - 0.0479994 i) X_0 X_2 X_3 Y_1 + (0.0204843 + 0.0413903 i) Y_0 Y_1 - \\
& (0.100378 + 0.158822 i) X_2 Y_0 Y_1 - (0.0742108 - 0.0652377 i) X_3 Y_0 Y_1 - \\
& (0.129243 - 0.0490667 i) X_2 X_3 Y_0 Y_1 + (0.387755 - 0.0148325 i) Y_2 + \\
& (0.0759443 + 0.177558 i) X_0 Y_2 + (0.0729078 + 0.00302124 i) X_1 Y_2 + \\
& (0.0233371 - 0.116777 i) X_0 X_1 Y_2 - (0.176558 - 0.0705307 i) X_3 Y_2 - \\
& (0.174414 + 0.0512663 i) X_0 X_3 Y_2 - (0.281351 - 0.101811 i) X_1 X_3 Y_2 - \\
& (0.162741 - 0.175021 i) X_0 X_1 X_3 Y_2 - (0.131703 - 0.0253568 i) Y_0 Y_2 - \\
& (0.0493656 + 0.0322319 i) X_1 Y_0 Y_2 + (0.0241071 + 0.0577216 i) X_3 Y_0 Y_2 - \\
& (0.0473751 - 0.0227716 i) X_1 X_3 Y_0 Y_2 + (0.0282265 - 0.162902 i) Y_1 Y_2 - \\
& (0.244029 - 0.0552397 i) X_0 Y_1 Y_2 - (0.209727 + 0.118228 i) X_3 Y_1 Y_2 - \\
& (0.111494 + 0.137343 i) X_0 X_3 Y_1 Y_2 + (0.154124 + 0.0703164 i) Y_0 Y_1 Y_2 + \\
& (0.048284 - 0.116779 i) X_3 Y_0 Y_1 Y_2 + (0.121716 + 0.0316163 i) Y_3 + \\
& (0.193857 + 0.0953305 i) X_0 Y_3 + (0.14552 + 0.0148649 i) X_1 Y_3 - \\
& (0.34649 + 0.13327 i) X_0 X_1 Y_3 + (0.0129109 - 0.209901 i) X_2 Y_3 + \\
& (0.0717183 + 0.045016 i) X_0 X_2 Y_3 + (0.0771634 + 0.13191 i) X_1 X_2 Y_3 - \\
& (0.169984 + 0.0856401 i) X_0 X_1 X_2 Y_3 - (0.116867 - 0.0845557 i) Y_0 Y_3 + \\
& (0.0207638 - 0.102306 i) X_1 Y_0 Y_3 - (0.181642 + 0.130416 i) X_2 Y_0 Y_3 + \\
& (0.127109 - 0.0217103 i) X_1 X_2 Y_0 Y_3 + (0.21644 + 0.195854 i) Y_1 Y_3 + \\
& (0.0458996 - 0.077467 i) X_0 Y_1 Y_3 + (0.0301136 + 0.0924021 i) X_2 Y_1 Y_3 + \\
& (0.0863545 + 0.171016 i) X_0 X_2 Y_1 Y_3 + (0.130128 - 0.127814 i) Y_0 Y_1 Y_3 - \\
& (0.0537432 + 0.0760658 i) X_2 Y_0 Y_1 Y_3 - (0.124054 + 0.147731 i) Y_2 Y_3 + \\
& (0.00920913 + 0.184613 i) X_0 Y_2 Y_3 - (0.0183465 - 0.210915 i) X_1 Y_2 Y_3 - \\
& (0.100371 - 0.00618587 i) X_0 X_1 Y_2 Y_3 + (0.263894 - 0.130642 i) Y_0 Y_2 Y_3 - \\
& (0.163261 - 0.0912035 i) X_1 Y_0 Y_2 Y_3 - (0.108397 + 0.125756 i) Y_1 Y_2 Y_3 - \\
& (0.0155428 - 0.199989 i) X_0 Y_1 Y_2 Y_3 - (0.0928119 - 0.0133456 i) Y_0 Y_1 Y_2 Y_3 + \\
& (0.012258 - 0.172403 i) Z_0 + (0.0792935 + 0.0718635 i) X_1 Z_0 + (0.221004 - 0.0825756 i) X_2 Z_0 + \\
& (0.00795677 + 0.130769 i) X_1 X_2 Z_0 - (0.00317011 + 0.0223506 i) X_3 Z_0 - \\
& (0.183688 - 0.263334 i) X_1 X_3 Z_0 + (0.0264097 + 0.0602293 i) X_2 X_3 Z_0 - \\
& (0.100799 - 0.017336 i) X_1 X_2 X_3 Z_0 - (0.0875981 + 0.044493 i) Y_1 Z_0 + \\
& (0.100788 - 0.0581249 i) X_2 Y_1 Z_0 + (0.0656695 + 0.0845586 i) X_3 Y_1 Z_0 + \\
& (0.15461 - 0.186257 i) X_2 X_3 Y_1 Z_0 - (0.0412028 - 0.0551023 i) Y_2 Z_0 + \\
& (0.0622955 - 0.00253203 i) X_1 Y_2 Z_0 - (0.313465 - 0.157055 i) X_3 Y_2 Z_0 + \\
& (0.0689824 - 0.0983797 i) X_1 X_3 Y_2 Z_0 + (0.126765 + 0.172856 i) Y_1 Y_2 Z_0 + \\
& (0.289796 - 0.155365 i) X_3 Y_1 Y_2 Z_0 + (0.143475 + 0.0302876 i) Y_3 Z_0 - \\
& (0.117984 - 0.00764187 i) X_1 Y_3 Z_0 + (0.0344148 - 0.0744184 i) X_2 Y_3 Z_0 - \\
& (0.0449792 + 0.153595 i) X_1 X_2 Y_3 Z_0 + (0.0843795 + 0.018592 i) Y_1 Y_3 Z_0 + \\
& (0.125322 - 0.0423371 i) X_2 Y_1 Y_3 Z_0 + (0.0649242 + 0.268432 i) Y_2 Y_3 Z_0 + \\
& (0.0167435 + 0.01368 i) X_1 Y_2 Y_3 Z_0 - (0.162478 + 0.0727465 i) Y_1 Y_2 Y_3 Z_0 + \\
& (0.05368 - 0.00692728 i) Z_1 + (0.0082131 + 0.0496404 i) X_0 Z_1 + \\
& (0.113897 - 0.0578037 i) X_2 Z_1 + (0.243332 - 0.129957 i) X_0 X_2 Z_1 + \\
& (0.126699 + 0.0288975 i) X_3 Z_1 - (0.00437977 - 0.0381475 i) X_0 X_3 Z_1 + \\
& (0.148532 + 0.0922701 i) X_2 X_3 Z_1 - (0.1456 + 0.00797929 i) X_0 X_2 X_3 Z_1 - \\
& (0.262412 + 0.0336572 i) Y_0 Z_1 - (0.0733418 + 0.161417 i) X_2 Y_0 Z_1 + \\
& (0.0374862 - 0.0130858 i) X_3 Y_0 Z_1 + (0.307553 - 0.132099 i) X_2 X_3 Y_0 Z_1 - \\
& (0.082675 - 0.0179072 i) Y_2 Z_1 + (0.0337695 + 0.0289139 i) X_0 Y_2 Z_1 +
\end{aligned}$$

$(0.213034 + 0.0467637 i) X_3 Y_2 Z_1 - (0.305141 + 0.094518 i) X_0 X_3 Y_2 Z_1 +$
 $(0.394488 - 0.0194259 i) Y_0 Y_2 Z_1 + (0.009109 + 0.0738722 i) X_3 Y_0 Y_2 Z_1 +$
 $(0.0291045 + 0.0148401 i) Y_3 Z_1 + (0.163487 - 0.0867468 i) X_0 Y_3 Z_1 +$
 $(0.0356035 + 0.137596 i) X_2 Y_3 Z_1 + (0.0104232 - 0.0166613 i) X_0 X_2 Y_3 Z_1 -$
 $(0.251575 + 0.02275 i) Y_0 Y_3 Z_1 - (0.137396 + 0.231387 i) X_2 Y_0 Y_3 Z_1 +$
 $(0.0671383 + 0.10598 i) Y_2 Y_3 Z_1 + (0.0382172 + 0.0202258 i) X_0 Y_2 Y_3 Z_1 -$
 $(0.0256903 + 0.0246108 i) Y_0 Y_2 Y_3 Z_1 - (0.125615 - 0.0458112 i) Z_0 Z_1 +$
 $(0.091672 + 0.00244276 i) X_2 Z_0 Z_1 - (0.0683081 - 0.0610363 i) X_3 Z_0 Z_1 +$
 $(0.0396182 + 0.0635323 i) X_2 X_3 Z_0 Z_1 - (0.00798425 - 0.0814928 i) Y_2 Z_0 Z_1 -$
 $(0.302461 + 0.0300223 i) X_3 Y_2 Z_0 Z_1 - (0.00863763 + 0.185461 i) Y_3 Z_0 Z_1 +$
 $(0.0228531 - 0.180419 i) X_2 Y_3 Z_0 Z_1 + (0.078963 + 0.0852811 i) Y_2 Y_3 Z_0 Z_1 +$
 $(0.0592944 + 0.0716178 i) Z_2 - (0.0163462 - 0.220438 i) X_0 Z_2 -$
 $(0.0921145 - 0.029034 i) X_1 Z_2 - (0.0413391 - 0.068979 i) X_0 X_1 Z_2 +$
 $(0.0846124 + 0.0911488 i) X_3 Z_2 - (0.0600475 + 0.0140024 i) X_0 X_3 Z_2 +$
 $(0.135948 - 0.103332 i) X_1 X_3 Z_2 - (0.0400688 + 0.00787622 i) X_0 X_1 X_3 Z_2 +$
 $(0.0391413 - 0.0245469 i) Y_0 Z_2 - (0.0702704 + 0.0951658 i) X_1 Y_0 Z_2 +$
 $(0.113804 - 0.0563423 i) X_3 Y_0 Z_2 - (0.165769 + 0.0131844 i) X_1 X_3 Y_0 Z_2 +$
 $(0.286537 + 0.000570491 i) Y_1 Z_2 - (0.235762 - 0.0589613 i) X_0 Y_1 Z_2 -$
 $(0.0863246 + 0.0639564 i) X_3 Y_1 Z_2 - (0.0195507 + 0.169033 i) X_0 X_3 Y_1 Z_2 +$
 $(0.124421 - 0.273126 i) Y_0 Y_1 Z_2 - (0.229076 - 0.140783 i) X_3 Y_0 Y_1 Z_2 -$
 $(0.108642 + 0.0713794 i) Y_3 Z_2 - (0.310601 - 0.0510231 i) X_0 Y_3 Z_2 +$
 $(0.107262 - 0.115001 i) X_1 Y_3 Z_2 + (0.26597 - 0.160712 i) X_0 X_1 Y_3 Z_2 +$
 $(0.278523 - 0.177374 i) Y_0 Y_3 Z_2 - (0.147672 + 0.117622 i) X_1 Y_0 Y_3 Z_2 -$
 $(0.0674337 + 0.0208251 i) Y_1 Y_3 Z_2 + (0.0311524 + 0.0496553 i) X_0 Y_1 Y_3 Z_2 -$
 $(0.0608011 - 0.225331 i) Y_0 Y_1 Y_3 Z_2 - (0.356581 + 0.172364 i) Z_0 Z_2 +$
 $(0.157567 + 0.0705031 i) X_1 Z_0 Z_2 + (0.0917665 - 0.0414822 i) X_3 Z_0 Z_2 +$
 $(0.0186317 + 0.0151846 i) X_1 X_3 Z_0 Z_2 + (0.140185 + 0.213365 i) Y_1 Z_0 Z_2 +$
 $(0.0839304 - 0.0909731 i) X_3 Y_1 Z_0 Z_2 + (0.234909 - 0.0280979 i) Y_3 Z_0 Z_2 -$
 $(0.147588 + 0.0383531 i) X_1 Y_3 Z_0 Z_2 - (0.173351 - 0.129493 i) Y_1 Y_3 Z_0 Z_2 -$
 $(0.266064 + 0.065464 i) Z_1 Z_2 - (0.0522208 + 0.0413837 i) X_0 Z_1 Z_2 -$
 $(0.00217206 - 0.0380492 i) X_3 Z_1 Z_2 - (0.146249 + 0.0926279 i) X_0 X_3 Z_1 Z_2 -$
 $(0.118092 - 0.00735392 i) Y_0 Z_1 Z_2 + (0.21839 + 0.10288 i) X_3 Y_0 Z_1 Z_2 +$
 $(0.0182237 + 0.166576 i) Y_3 Z_1 Z_2 + (0.112114 + 0.166415 i) X_0 Y_3 Z_1 Z_2 +$
 $(0.165705 - 0.0245815 i) Y_0 Y_3 Z_1 Z_2 - (0.0788153 - 0.12333 i) Z_0 Z_1 Z_2 -$
 $(0.145257 - 0.0253789 i) X_3 Z_0 Z_1 Z_2 + (0.00319716 - 0.0750914 i) Y_3 Z_0 Z_1 Z_2 +$
 $(0.301125 + 0.184324 i) Z_3 + (0.077299 - 0.0233038 i) X_0 Z_3 -$
 $(0.0734543 + 0.169209 i) X_1 Z_3 + (0.0193107 + 0.041093 i) X_0 X_1 Z_3 -$
 $(0.129201 - 0.149992 i) X_2 Z_3 + (0.0665838 - 0.142464 i) X_0 X_2 Z_3 +$
 $(0.03258 - 0.102004 i) X_1 X_2 Z_3 - (0.426281 + 0.00638168 i) X_0 X_1 X_2 Z_3 -$
 $(0.0805751 + 0.0262904 i) Y_0 Z_3 + (0.102995 + 0.106833 i) X_1 Y_0 Z_3 +$
 $(0.0233841 + 0.117621 i) X_2 Y_0 Z_3 + (0.129553 - 0.0838349 i) X_1 X_2 Y_0 Z_3 -$
 $(0.144776 + 0.192052 i) Y_1 Z_3 - (0.0000439268 - 0.0865687 i) X_0 Y_1 Z_3 +$
 $(0.00858941 - 0.140433 i) X_2 Y_1 Z_3 + (0.213556 + 0.246046 i) X_0 X_2 Y_1 Z_3 +$
 $(0.00724796 + 0.0399417 i) Y_0 Y_1 Z_3 + (0.25324 + 0.0815949 i) X_2 Y_0 Y_1 Z_3 -$
 $(0.397101 + 0.0879622 i) Y_2 Z_3 + (0.0475653 + 0.101639 i) X_0 Y_2 Z_3 +$
 $(0.28701 + 0.158328 i) X_1 Y_2 Z_3 + (0.0369655 - 0.145613 i) X_0 X_1 Y_2 Z_3 +$
 $(0.10907 - 0.064299 i) Y_0 Y_2 Z_3 - (0.265683 - 0.000158504 i) X_1 Y_0 Y_2 Z_3 -$
 $(0.175712 - 0.0472335 i) Y_1 Y_2 Z_3 - (0.222683 + 0.0401293 i) X_0 Y_1 Y_2 Z_3 +$
 $(0.239375 + 0.0240611 i) Y_0 Y_1 Y_2 Z_3 - (0.0725419 + 0.104172 i) Z_0 Z_3 +$
 $(0.153932 + 0.0757236 i) X_1 Z_0 Z_3 + (0.00865591 - 0.126222 i) X_2 Z_0 Z_3 +$
 $(0.0822344 + 0.169773 i) X_1 X_2 Z_0 Z_3 - (0.172573 - 0.0115144 i) Y_1 Z_0 Z_3 -$

$$\begin{aligned}
& (0.00367448 + 0.0615287 i) X_2 Y_1 Z_0 Z_3 - (0.133848 - 0.10197 i) Y_2 Z_0 Z_3 - \\
& (0.112889 + 0.0443432 i) X_1 Y_2 Z_0 Z_3 + (0.0401193 + 0.00658239 i) Y_1 Y_2 Z_0 Z_3 + \\
& (0.00622848 + 0.0945268 i) Z_1 Z_3 + (0.119927 + 0.151045 i) X_0 Z_1 Z_3 - \\
& (0.0221698 + 0.125285 i) X_2 Z_1 Z_3 + (0.224221 - 0.0896901 i) X_0 X_2 Z_1 Z_3 - \\
& (0.256656 + 0.13314 i) Y_0 Z_1 Z_3 - (0.0574022 + 0.160521 i) X_2 Y_0 Z_1 Z_3 + \\
& (0.106982 - 0.0801998 i) Y_2 Z_1 Z_3 + (0.0566278 - 0.0265448 i) X_0 Y_2 Z_1 Z_3 + \\
& (0.33747 + 0.0840976 i) Y_0 Y_2 Z_1 Z_3 + (0.0289648 - 0.0513782 i) Z_0 Z_1 Z_3 - \\
& (0.0333275 - 0.232616 i) X_2 Z_0 Z_1 Z_3 - (0.118554 - 0.0940485 i) Y_2 Z_0 Z_1 Z_3 + \\
& (0.250222 + 0.0200241 i) Z_2 Z_3 - (0.0220778 - 0.0473595 i) X_0 Z_2 Z_3 - \\
& (0.0524376 - 0.181141 i) X_1 Z_2 Z_3 - (0.118562 + 0.0143808 i) X_0 X_1 Z_2 Z_3 - \\
& (0.0333759 - 0.107825 i) Y_0 Z_2 Z_3 + (0.224467 - 0.0162795 i) X_1 Y_0 Z_2 Z_3 + \\
& (0.114723 + 0.0714817 i) Y_1 Z_2 Z_3 + (0.00385059 - 0.146805 i) X_0 Y_1 Z_2 Z_3 + \\
& (0.0272165 + 0.0894063 i) Y_0 Y_1 Z_2 Z_3 - (0.0823478 + 0.112031 i) Z_0 Z_2 Z_3 + \\
& (0.0607849 + 0.148174 i) X_1 Z_0 Z_2 Z_3 + (0.10218 + 0.022369 i) Y_1 Z_0 Z_2 Z_3 - \\
& (0.0358313 + 0.0100718 i) Z_1 Z_2 Z_3 + (0.0491231 + 0.0468069 i) X_0 Z_1 Z_2 Z_3 - \\
& (0.00587749 - 0.139545 i) Y_0 Z_1 Z_2 Z_3 - (0.0512722 + 0.32487 i) Z_0 Z_1 Z_2 Z_3
\end{aligned}$$

» error: 0

TransformationFunction

CalcCircuitGenerator[Damp₂[x]]

"="

CalcCircuitGenerator[Damp₂[x], TransformationFunction → Simplify]

$$\begin{aligned}
& \frac{1}{4} \left(-2 i \operatorname{Log}[\sqrt{1-x}] - i \operatorname{Log}[1-x] \right) \operatorname{Id}_1 + \frac{1}{4} i \operatorname{Log}[1-x] X_2 X_5 - \\
& \frac{1}{4} \operatorname{Log}[1-x] X_5 Y_2 - \frac{1}{4} \operatorname{Log}[1-x] X_2 Y_5 - \frac{1}{4} i \operatorname{Log}[1-x] Y_2 Y_5 + \\
& \frac{1}{4} i \operatorname{Log}[1-x] Z_2 + \frac{1}{4} i \operatorname{Log}[1-x] Z_5 + \frac{1}{4} \left(2 i \operatorname{Log}[\sqrt{1-x}] - i \operatorname{Log}[1-x] \right) Z_2 Z_5 \\
& = \\
& -\frac{1}{2} i \operatorname{Log}[1-x] \operatorname{Id}_1 + \frac{1}{4} i \operatorname{Log}[1-x] X_2 X_5 - \frac{1}{4} \operatorname{Log}[1-x] X_5 Y_2 - \\
& \frac{1}{4} \operatorname{Log}[1-x] X_2 Y_5 - \frac{1}{4} i \operatorname{Log}[1-x] Y_2 Y_5 + \frac{1}{4} i \operatorname{Log}[1-x] Z_2 + \frac{1}{4} i \operatorname{Log}[1-x] Z_5
\end{aligned}$$

CalcCircuitGenerator[C₁@R_{x0}[x]]

"="

CalcCircuitGenerator[C₁@R_{x0}[x], TransformationFunction → Identity]

$$-\frac{x X_0}{4} + \frac{1}{4} x X_0 Z_1$$

=

$$\begin{aligned} & -\frac{1}{2} i \left(\frac{1}{2} \operatorname{Log} \left[\cos \left[\frac{x}{2} \right] - i \sin \left[\frac{x}{2} \right] \right] + \frac{1}{2} \operatorname{Log} \left[\cos \left[\frac{x}{2} \right] + i \sin \left[\frac{x}{2} \right] \right] \right) \operatorname{Id}_1 - \\ & \frac{1}{2} i \left(\frac{1}{2} \operatorname{Log} \left[\cos \left[\frac{x}{2} \right] - i \sin \left[\frac{x}{2} \right] \right] - \frac{1}{2} \operatorname{Log} \left[\cos \left[\frac{x}{2} \right] + i \sin \left[\frac{x}{2} \right] \right] \right) X_0 + \\ & \frac{1}{2} i \left(\frac{1}{2} \operatorname{Log} \left[\cos \left[\frac{x}{2} \right] - i \sin \left[\frac{x}{2} \right] \right] + \frac{1}{2} \operatorname{Log} \left[\cos \left[\frac{x}{2} \right] + i \sin \left[\frac{x}{2} \right] \right] \right) Z_1 + \\ & \frac{1}{2} i \left(\frac{1}{2} \operatorname{Log} \left[\cos \left[\frac{x}{2} \right] - i \sin \left[\frac{x}{2} \right] \right] - \frac{1}{2} \operatorname{Log} \left[\cos \left[\frac{x}{2} \right] + i \sin \left[\frac{x}{2} \right] \right] \right) X_0 Z_1 \end{aligned}$$

$$\text{in} = \text{Kraus}_0 @ \left\{ \begin{pmatrix} 1 & 0 \\ 0 & \sqrt{1-x} \end{pmatrix}, \begin{pmatrix} 0 & \sqrt{x} \\ 0 & 0 \end{pmatrix} \right\};$$

CalcCircuitGenerator[in]

"="

CalcCircuitGenerator[in, TransformationFunction → (Simplify[#, 0 ≤ x ≤ 1] &)]

$$\begin{aligned} & \frac{1}{4} \left(-i \operatorname{Log} [\sqrt{1-x}] - i \operatorname{Log} [\operatorname{Conjugate} [\sqrt{1-x}]] - i \operatorname{Log} [\sqrt{1-x} \operatorname{Conjugate} [\sqrt{1-x}]] \right) \operatorname{Id}_1 - \\ & \frac{i \sqrt{x} \operatorname{Conjugate} [\sqrt{x}] \operatorname{Log} [\sqrt{1-x} \operatorname{Conjugate} [\sqrt{1-x}]] X_0 X_1}{4 (-1 + \sqrt{1-x} \operatorname{Conjugate} [\sqrt{1-x}])} + \\ & \frac{\sqrt{x} \operatorname{Conjugate} [\sqrt{x}] \operatorname{Log} [\sqrt{1-x} \operatorname{Conjugate} [\sqrt{1-x}]] X_1 Y_0}{4 (-1 + \sqrt{1-x} \operatorname{Conjugate} [\sqrt{1-x}])} + \\ & \frac{\sqrt{x} \operatorname{Conjugate} [\sqrt{x}] \operatorname{Log} [\sqrt{1-x} \operatorname{Conjugate} [\sqrt{1-x}]] X_0 Y_1}{4 (-1 + \sqrt{1-x} \operatorname{Conjugate} [\sqrt{1-x}])} + \\ & \frac{i \sqrt{x} \operatorname{Conjugate} [\sqrt{x}] \operatorname{Log} [\sqrt{1-x} \operatorname{Conjugate} [\sqrt{1-x}]] Y_0 Y_1}{4 (-1 + \sqrt{1-x} \operatorname{Conjugate} [\sqrt{1-x}])} + \\ & \frac{1}{4} \left(i \operatorname{Log} [\sqrt{1-x}] - i \operatorname{Log} [\operatorname{Conjugate} [\sqrt{1-x}]] + i \operatorname{Log} [\sqrt{1-x} \operatorname{Conjugate} [\sqrt{1-x}]] \right) Z_0 + \\ & \frac{1}{4} \left(-i \operatorname{Log} [\sqrt{1-x}] + i \operatorname{Log} [\operatorname{Conjugate} [\sqrt{1-x}]] + i \operatorname{Log} [\sqrt{1-x} \operatorname{Conjugate} [\sqrt{1-x}]] \right) Z_1 + \\ & \frac{1}{4} \left(i \operatorname{Log} [\sqrt{1-x}] + i \operatorname{Log} [\operatorname{Conjugate} [\sqrt{1-x}]] - i \operatorname{Log} [\sqrt{1-x} \operatorname{Conjugate} [\sqrt{1-x}]] \right) Z_0 Z_1 \end{aligned}$$

=

$$\begin{aligned} & -\frac{1}{2} i \operatorname{Log} [1-x] \operatorname{Id}_1 + \frac{1}{4} i \operatorname{Log} [1-x] X_0 X_1 - \frac{1}{4} \operatorname{Log} [1-x] X_1 Y_0 - \\ & \frac{1}{4} \operatorname{Log} [1-x] X_0 Y_1 - \frac{1}{4} i \operatorname{Log} [1-x] Y_0 Y_1 + \frac{1}{4} i \operatorname{Log} [1-x] Z_0 + \frac{1}{4} i \operatorname{Log} [1-x] Z_1 \end{aligned}$$

Errors

CalcCircuitGenerator[Poop₀]

... **CalcCircuitMatrix**: Circuit contained an unrecognised or unsupported gate: Poop₀

... **CalcCircuitGenerator**: The above error prevented calculating the generator.

\$Failed

CalcCircuitGenerator[U₀@{{0, 0}, {0, 0}}]

... **MatrixLog**: The function Log is not analytic or defined at 0.

... **CalcCircuitGenerator**: The above error prevented calculating the generator.

\$Failed

CalcCircuitGenerator[X₀, TransformationFunction → hi]

... **CalcCircuitGenerator**: The given TransformationFunction did not return a matrix.

\$Failed

CalcCircuitGenerator[X₀, TransformationFunction → (# / 0 &)]

... **Power**: Infinite expression $\frac{1}{0}$ encountered.

... **CalcCircuitGenerator**: The above error prevented calculating the generator.

\$Failed

MatrixQ

MatrixQ

CalcCircuitGenerator[X₀, TransformationFunction → False]

... **CalcCircuitGenerator**: The given TransformationFunction did not return a matrix.

\$Failed

CalcCircuitGenerator[X₀, UnsupportedOption → False]

... **OptionValue**: Unknown option UnsupportedOption for CalcCircuitGenerator.

$$\frac{\pi \text{Id}_0}{2} - \frac{\pi X_0}{2}$$

CalcCircuitGenerator[bleh]

... **CalcCircuitGenerator**: Invalid arguments. See ?CalcCircuitGenerator

\$Failed

CalcCircuitGenerator[bleh, meh]

... **CalcCircuitGenerator**: Invalid arguments. See ?CalcCircuitGenerator

\$Failed