Quantum Logic Circuit Identities

typeset by Stephen Bullock
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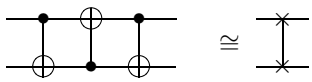
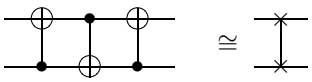
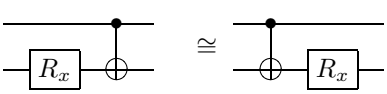
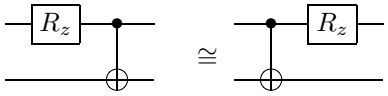
Lifted from Vivek Shende's Identity Table, joint with Igor Markov
U M EECS

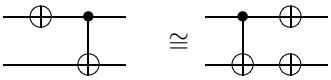
Table available at http://www.arxiv.org/abs/quant-ph/0308033

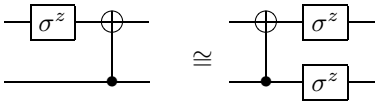


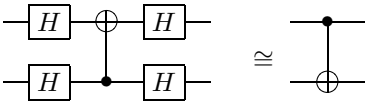


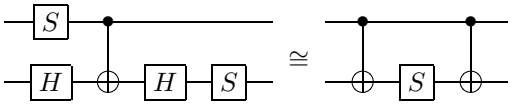


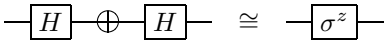


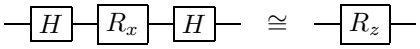


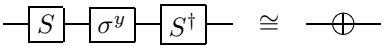


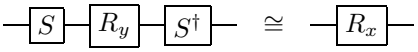


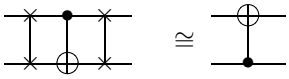


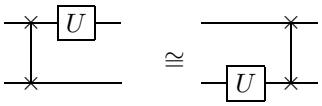












Definitions: $R_x(t) = \begin{pmatrix} \cos t/2 & -i\sin t/2 \\ -i\sin t/2 & \cos t/2 \end{pmatrix}$, $R_y(t) = \begin{pmatrix} \cos t/2 & \sin t/2 \\ -\sin t/2 & \cos t/2 \end{pmatrix}$, $R_z(t) = \begin{pmatrix} e^{-it/2} & 0 \\ 0 & e^{it/2} \end{pmatrix}$,
$H = \frac{1}{\sqrt{2}}\begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}$, $S = e^{i\pi/4}R_z(\pi/2) = \begin{pmatrix} 1 & 0 \\ 0 & i \end{pmatrix}$, $\sigma^z = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$, $\sigma^y = \begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix}$