GHZ Appendix

This appendix show another way of "doing the math" in the GHZ experiment.

$$\Psi_{yyx} = \frac{1}{\sqrt{2}}\cdot\left(H_1\cdot H_2\cdot H_3 + V_1\cdot V_2\cdot V_3\right) \left|\begin{array}{l} \text{substitute}, H_1 = \frac{1}{\sqrt{2}}\cdot\left(R_1 + L_1\right) \\ \text{substitute}, H_2 = \frac{1}{\sqrt{2}}\cdot\left(R_2 + L_2\right) \\ \text{substitute}, H_3 = \frac{1}{\sqrt{2}}\cdot\left(H'_3 + V'_3\right) \\ \text{substitute}, V_1 = \frac{i}{\sqrt{2}}\cdot\left(L_1 - R_1\right) \\ \text{substitute}, V_2 = \frac{i}{\sqrt{2}}\cdot\left(L_2 - R_2\right) \\ \text{substitute}, V_3 = \frac{1}{\sqrt{2}}\cdot\left(H'_3 - V'_3\right) \\ \text{simplify} \end{array}\right. \rightarrow \Psi_{yyx} = \frac{1}{2}\cdot R_1\cdot R_2\cdot V'_3 + \frac{1}{2}\cdot R_1\cdot L_2\cdot H'_3 + \frac{1}{2}\cdot L_1\cdot R_2\cdot H'_3 + \frac{1}{2}\cdot L_1\cdot L_2\cdot V'_3$$

$$\Psi_{yxy} = \frac{1}{\sqrt{2}}\cdot\left(H_1\cdot H_2\cdot H_3 + V_1\cdot V_2\cdot V_3\right) \left|\begin{array}{l} \text{substitute}, H_1 = \frac{R_1 + L_1}{\sqrt{2}} \\ \text{substitute}, H_2 = \frac{H'_2 + V'_2}{\sqrt{2}} \\ \text{substitute}, H_3 = \frac{R_3 + L_3}{\sqrt{2}} \\ \text{substitute}, V_1 = \frac{i}{\sqrt{2}}\cdot\left(L_1 - R_1\right) \\ \text{substitute}, V_2 = \frac{H'_2 - V'_2}{\sqrt{2}} \\ \text{substitute}, V_3 = \frac{i\cdot\left(L_3 - R_3\right)}{\sqrt{2}} \\ \text{simplify} \end{array}\right. \rightarrow \Psi_{yxy} = \frac{1}{2}\cdot R_1\cdot H'_2\cdot L_3 + \frac{1}{2}\cdot R_1\cdot V'_2\cdot R_3 + \frac{1}{2}\cdot L_1\cdot H'_2\cdot R_3 + \frac{1}{2}\cdot L_1\cdot V'_2\cdot L_3$$

$$\Psi_{xyy} = \frac{1}{\sqrt{2}}\cdot\left(H_1\cdot H_2\cdot H_3 + V_1\cdot V_2\cdot V_3\right) \left|\begin{array}{l} \text{substitute}, H_1 = \frac{H'_1 + V'_1}{\sqrt{2}} \\ \text{substitute}, H_2 = \frac{R_2 + L_2}{\sqrt{2}} \\ \text{substitute}, H_3 = \frac{R_3 + L_3}{\sqrt{2}} \\ \text{substitute}, V_1 = \frac{H'_1 - V'_1}{\sqrt{2}} \\ \text{substitute}, V_2 = \frac{i\cdot\left(L_2 - R_2\right)}{\sqrt{2}} \\ \text{substitute}, V_3 = \frac{i\cdot\left(L_3 - R_3\right)}{\sqrt{2}} \\ \text{simplify} \end{array}\right. \rightarrow \Psi_{xyy} = \frac{1}{2}\cdot H'_1\cdot R_2\cdot L_3 + \frac{1}{2}\cdot H'_1\cdot L_2\cdot R_3 + \frac{1}{2}\cdot V'_1\cdot R_2\cdot R_3 + \frac{1}{2}\cdot V'_1\cdot L_2\cdot L_3$$

$$\Psi_{xxx} = \frac{1}{\sqrt{2}} \cdot \left(H_1 \cdot H_2 \cdot H_3 + V_1 \cdot V_2 \cdot V_3\right) \left| \begin{array}{l} \text{substitute}, H_1 = \dfrac{H'_1 + V'_1}{\sqrt{2}} \\ \text{substitute}, H_2 = \dfrac{H'_2 + V'_2}{\sqrt{2}} \\ \text{substitute}, H_3 = \dfrac{H'_3 + V'_3}{\sqrt{2}} \\ \text{substitute}, V_1 = \dfrac{H'_1 - V'_1}{\sqrt{2}} \\ \text{substitute}, V_2 = \dfrac{H'_2 - V'_2}{\sqrt{2}} \\ \text{substitute}, V_3 = \dfrac{H'_3 - V'_3}{\sqrt{2}} \\ \text{simplify} \end{array} \right. \rightarrow \Psi_{xxx} = \frac{1}{2} \cdot H'_1 \cdot H'_2 \cdot H'_3 + \frac{1}{2} \cdot H'_1 \cdot V'_2 \cdot V'_3 + \frac{1}{2} \cdot V'_1 \cdot H'_2 \cdot V'_3 + \frac{1}{2} \cdot V'_1 \cdot V'_2 \cdot H'_3$$