Spinor boost

This spinor is for an electron at rest with spin up along the z axis.

$$u = \sqrt{2m} \begin{pmatrix} 1 \\ 0 \\ 0 \\ 0 \end{pmatrix}$$

This matrix boosts a spinor in the z direction where $E^2 = p^2 + m^2$.

$$\Lambda = \frac{1}{\sqrt{2m(E+m)}} \begin{pmatrix} E+m & 0 & p & 0 \\ 0 & E+m & 0 & p \\ p & 0 & E+m & 0 \\ 0 & p & 0 & E+m \end{pmatrix}$$

Hence

$$u' = \Lambda u = \frac{1}{\sqrt{E+m}} \begin{pmatrix} E+m & 0 & p & 0 \\ 0 & E+m & 0 & p \\ p & 0 & E+m & 0 \\ 0 & p & 0 & E+m \end{pmatrix} \begin{pmatrix} 1 \\ 0 \\ 0 \\ 0 \end{pmatrix} = \frac{1}{\sqrt{E+m}} \begin{pmatrix} E+m \\ 0 \\ p \\ 0 \end{pmatrix}$$