

$\mathcal{L}[\mathbf{h}[F_], L1_], \mathbf{h}[F_], L2_]] :=$

$\text{Simplify}[\text{Expand}[L1 (L2 /. \{t_{i_} \Rightarrow t_i^{-1}, x_{i_} \Rightarrow \bar{x}_i\})] /.$

$$\left\{ x_{i_} \bar{x}_{j_} \Rightarrow \left\{ \begin{array}{ll} \frac{(t_{F[[1]]} - 1) (t_{F[[i]]} - 1) (1 - t_{F[[1]]} t_{F[[i]])})}{t_{F[[1]]} t_{F[[i]]}} & i = j \\ \frac{-(t_{F[[1]]} - 1) (t_{F[[i]]} - 1) (t_{F[[j]]} - 1)}{t_{F[[j]]}} & i < j \\ \frac{-(t_{F[[1]]} - 1) (t_{F[[i]]} - 1) (t_{F[[j]]} - 1)}{t_{F[[1]]} t_{F[[j]]}} & i > j \end{array} \right\} \right\}$$