

Pensieve header: A mini implementation of the Gassner matrices.

```

U[n_, i_, t_] := ReplacePart[
  IdentityMatrix[n],
  {{i, i} → 1 - t, {i, i + 1} → t,
   {i + 1, i} → 1, {i + 1, i + 1} → 0}
];

MatrixForm /@ (ms1 = {U[3, 1, t2], U[3, 2, t3], U[3, 1, t3]})
{

$$\begin{pmatrix} 1 - t_2 & t_2 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix}, \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 - t_3 & t_3 \\ 0 & 1 & 0 \end{pmatrix}, \begin{pmatrix} 1 - t_3 & t_3 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix}
}

Dot@@ms1 // Simplify // MatrixForm

$$\begin{pmatrix} 1 - t_3 & -(-1 + t_2) t_3 & t_2 t_3 \\ 1 - t_3 & t_3 & 0 \\ 1 & 0 & 0 \end{pmatrix}$$


MatrixForm /@ (ms2 = {U[3, 2, t3], U[3, 1, t3], U[3, 2, t2]})
{

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 - t_3 & t_3 \\ 0 & 1 & 0 \end{pmatrix}, \begin{pmatrix} 1 - t_3 & t_3 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix}, \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 - t_2 & t_2 \\ 0 & 1 & 0 \end{pmatrix}
}

Dot@@ms2 // Simplify // MatrixForm

$$\begin{pmatrix} 1 - t_3 & -(-1 + t_2) t_3 & t_2 t_3 \\ 1 - t_3 & t_3 & 0 \\ 1 & 0 & 0 \end{pmatrix}$$$$$$

```