

Pensieve header: Showing the non-unitarity of Gassner on a pure w-braid.

Definitions (as in the paper).

```

Ui[t_] := ReplacePart[IdentityMatrix[n],
  {{i, i} → 1 - t, {i, i + 1} → 1,
   {i + 1, i} → t, {i + 1, i + 1} → 0}];
Ui-1[t_] := Inverse[Ui[t]];
Ω[τ___] := Table[
  Which[i < j, 0, i == j, (1 - t{τ}[[i]])-1, i > j, 1],
  {i, n}, {j, n}];
X̄ := X /. ti → 1/ti;
Ui,j := ReplacePart[IdentityMatrix[n],
  {{i, i} → 1, {i, j} → 1 - ti,
   {j, i} → 0, {j, j} → ti}}];
Vi,j := ReplacePart[IdentityMatrix[n],
  {{i, i} → 1, {i, j} → 1 - tj,
   {j, i} → 0, {j, j} → ti}}];
DD := DiagonalMatrix[Table[1 - ti, {i, n}]];

```

Non unitarity.

```
n = 3;
```

```
Hold[X̄] // FullForm
```

```
Hold[OverBar[Pattern[X, Blank[]]]]
```

```
eigs = Eigenvalues[U1,2.U3,2.U2,1]
```

$$\left\{ 1, \frac{1}{2} \left(t_2 + t_3 - t_2 t_3 + t_1 t_2 t_3 - \sqrt{-4 t_1 t_2 t_3 + (-t_2 - t_3 + t_2 t_3 - t_1 t_2 t_3)^2} \right), \right. \\ \left. \frac{1}{2} \left(t_2 + t_3 - t_2 t_3 + t_1 t_2 t_3 + \sqrt{-4 t_1 t_2 t_3 + (-t_2 - t_3 + t_2 t_3 - t_1 t_2 t_3)^2} \right) \right\}$$

```
eigs * OverBar[eigs] /. Table[ti → RandomReal[], {i, 3}]
```

```
{1, 0.31808, 3.14387}
```