

```
(*this program does some calculations relating to some
conjectures about the relationship between "ambijunctions" in
the sense of lauda and "markov traces" in the sense of jones.*)

<< LinearAlgebra`MatrixManipulation` 

m = 

|   |   |
|---|---|
| 1 | 1 |
| 2 | 0 |



{{1, 1}, {2, 0} }

{nrows, ncols} = Dimensions[m]

{2, 2}

t1 = Flatten[Table[{r, c}, {r, 1, nrows}, {c, 1, ncols}], 1];

t2 = Select[t1, m[[#[[1]], #[[2]]]] == 1 &];

t3 = Map[Apply[v, #] &, t2];

req[m1_, r_] := (Sum[v[r, c]*m1[[r, c]], {c, 1, ncols}] == k)

ceq[m1_, c_] := (Sum[(1/v[r, c])*m1[[r, c]], {r, 1, nrows}] == k)

Solve[Join[Table[req[m, r], {r, 1, nrows}],
Table[ceq[m, c], {c, 1, ncols}]], Append[t3, k]]

{}

Eigenvalues[BlockMatrix[

|                            |                            |
|----------------------------|----------------------------|
| Table[0, {ncols}, {ncols}] | Transpose[m]               |
| m                          | Table[0, {nrows}, {nrows}] |

]]

```

$$\{-\sqrt{3 + \sqrt{5}}, \sqrt{3 + \sqrt{5}}, -\sqrt{3 - \sqrt{5}}, \sqrt{3 - \sqrt{5}}\}$$

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SingularValueList[N[m]]
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$$\{2.28825, 0.874032\}$$

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 $\sqrt{3 + \sqrt{5}}$  // N
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$$2.28825$$