

## 03 - Combinatorics

### More to come: MuPAD-combinat is being ported to Sage!

```
Permutations(4)
```

```
Standard permutations of 4
```

```
P4 = Permutations(4)
```

```
P4.count()
```

```
24
```

```
P4.list()
```

```
[[1, 2, 3, 4], [1, 2, 4, 3], [1, 3, 2, 4], [1, 3, 4, 2], [1, 4, 2, 3], [1, 4, 3, 2], [2, 1, 3, 4], [2, 1, 4, 3], [2, 3, 1, 4], [2, 3, 4, 1], [2, 4, 1, 3], [2, 4, 3, 1], [3, 1, 2, 4], [3, 1, 4, 2], [3, 2, 1, 4], [3, 2, 4, 1], [3, 4, 1, 2], [3, 4, 2, 1], [4, 1, 2, 3], [4, 1, 3, 2], [4, 2, 1, 3], [4, 2, 3, 1], [4, 3, 1, 2], [4, 3, 2, 1]]
```

```
p = P4.random_element(); p
```

```
[4, 1, 2, 3]
```

```
p*p
```

```
[3, 4, 1, 2]
```

```
p.robinson_schensted()
```

```
[[[1, 2, 3], [4]], [[1, 3, 4], [2]]]
```

```
latex(p.robinson_schensted())
```

```
\begin{array}{l}{\def\lr#1{\multicolumn{1}{|@{\hspace{.6ex}}c@{\hspace{.6ex}}|}{\raisebox{-.3ex}{\$#1\$}}}\n\raisebox{-.6ex}{\$}\begin{array}[b]{ccc}\cline{1-1}\cline{2-2}\cline{3-3}\lr{1}&\lr{2}&\lr{3}\n\cline{1-1}\cline{2-2}\cline{3-3}\lr{4}\n\cline{1-1}\end{array}\$}\n},\n{\def\lr#1{\multicolumn{1}{|@{\hspace{.6ex}}c@{\hspace{.6ex}}|}{\raisebox{-.3ex}{\$#1\$}}}\n\raisebox{-.6ex}{\$}\begin{array}[b]{ccc}\cline{1-1}\cline{2-2}\cline{3-3}\lr{1}&\lr{3}&\lr{4}\n
```

```
\cline{1-1}\cline{2-2}\cline{3-3}
\lr{2} \\
\cline{1-1}
\end{array}$}
}\end{array}
```