

# Semigroup Package

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# TranSemi 0.1

by

Robert Arthur, Steve Linton, Götz Pfeiffer, Nikola Ruškuc, Edmund Robertson

School of Mathematical and Computational Sciences  
University of St. Andrews, North Haugh, St. Andrews, Fife KY16 9SS, Scotland

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# 1

# Algorithms for Transformation Semigroups (preliminary)

TranSemi is the GAP 4 version of the GAP 3 package Monoid. It is still under development.

This package provides many specific methods for calculating with transformation semigroups. Most of the methods occlude the generic methods in the GAP 4.1 library, with notable exceptions listed below, which are only available in TranSemi.

1 ▶ `DisplayTransformationSemigroup( S )` O

Produces a convenient display of a transformation semigroup's DClass structure. Let  $S$  have degree  $n$ . Then for each  $r \leq n$ , we show all D classes of rank  $n$ .

A regular D class with a single H class of size 120 appears as

```
*[H size = 120, 1 L classes, 1 R classes]
```

(the \* denoting regularity).

A non regular D class with singleton H classes, 15 L classes and 1 R class appears as:

```
[H size = 1, 15 L classes (3 image types), 1 R classes (1 kernel types)]
```

The "(3 image types)" means that each element of the D class has one of 3 different image sets and for each of the three image sets, there are 5 L classes with that image set.

2 ▶ `GenSchutzenbergerGroup( G )` A

This function unfolds the greens class  $G$ . It determines (and returns) the generalised Schutzenberger group of the representative of  $G$ .

# Index

This index covers only this manual. A page number in *italics* refers to a whole section which is devoted to the indexed subject. Keywords are sorted with case and spaces ignored, e.g., “PermutationCharacter” comes before “permutation group”.

## D

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## G

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