

cliques of transforms

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```
In[1]:= SetDirectory["1:"]; << goedel86.16a; << tools.m

:Package Title: goedel86.16a          2006 October 16 at 10:10 p.m.

It is now: 2006 Oct 17 at 13:13

Loading Simplification Rules

TOOLS.M                      Revised 2006 October 12

weightlimit = 40
```

summary

A formula for cliques of transforms is derived, and two applications are given to collections of cartesian squares.

cliques formula

Clearing the **simplify** flag reduces the execution time from 70 seconds to 10 seconds.

```
In[2]:= simplify = False;
```

This takes about 70 seconds when simplify is set versus 10 seconds when simplify is cleared

```
In[3]:= cliques[composite[inverse[funpart[x]], y, funpart[x]]] // Normality
```

```
Out[3]= cliques[composite[inverse[funpart[x]], y, funpart[x]]] ==
intersection[image[inverse[IMAGE[funpart[x]]], cliques[y], P[domain[funpart[x]]]]
```

```
In[4]:= cliques[composite[inverse[funpart[x_]], y_, funpart[x_]]] :=
intersection[image[inverse[IMAGE[funpart[x]]], cliques[y], P[domain[funpart[x]]]]
```

applications

Theorem. The class of cartesian squares of a pairwise disjoint collection of sets is a pairwise disjoint collection of cartesian squares.

```
In[5]:= Map[image[IMAGE[CART], image[IMAGE[DUP], #]] &,
  SubstTest[cliques, composite[inverse[funpart[x]], y, funpart[x]],
    {x → composite[CART, DUP], y → union[DISJOINT, Id]}]]
```

```
Out[5]= image[IMAGE[CART], image[IMAGE[DUP], cliques[union[DISJOINT, Id]]]] ==
  intersection[cliques[union[DISJOINT, Id]], P[image[CART, Id]]]
```

```
In[6]:= image[IMAGE[CART], image[IMAGE[DUP], cliques[union[DISJOINT, Id]]]] :=
  intersection[cliques[union[DISJOINT, Id]], P[image[CART, Id]]]
```

Theorem. The class of cartesian squares of a nest of sets is a nest of cartesian squares.

```
In[7]:= Map[image[IMAGE[CART], image[IMAGE[DUP], #]] &,
  SubstTest[cliques, composite[inverse[funpart[x]], y, funpart[x]],
    {x → composite[CART, DUP], y → union[S, inverse[S]}]]
```

```
Out[7]= image[IMAGE[CART], image[IMAGE[DUP], cliques[union[S, inverse[S]]]]] ==
  intersection[cliques[union[S, inverse[S]]], P[image[CART, Id]]]
```

```
In[8]:= image[IMAGE[CART], image[IMAGE[DUP], cliques[union[S, inverse[S]]]]] :=
  intersection[cliques[union[S, inverse[S]]], P[image[CART, Id]]]
```