

cover[x ◦ id[y]]

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```
In[1]:= SetDirectory["1:"]; << goedel.10jan29a; << tools.m

:Package Title: goedel.10jan29a          2010 January 29 at 3:05 p.m.

It is now: 2010 Jan 30 at 9:48

Loading Simplification Rules

TOOLS.M                                Revised 2010 January 29

weightlimit = 40
```

summary

The restriction of a cover relation is contained in the cover relation of a restriction.

derivation

Lemma.

```
In[4]:= SubstTest[dif, intersection[Di, t],
               composite[intersection[Di, t], intersection[Di, t]], t → composite[x, id[y]]] // Reverse

Out[4]= composite[intersection[Di, x,
               complement[composite[intersection[Di, x], id[y], intersection[Di, x]]]],
               id[y]] == cover[composite[x, id[y]]]

In[5]:= composite[intersection[Di, x_,
               complement[composite[intersection[Di, x_], id[y_], intersection[Di, x_]]]],
               id[y_]] := cover[composite[x, id[y]]]
```

Lemma.

```
In[11]:= (SubstTest[subclass, intersection[t, complement[composite[t, t]]], intersection[t,
               complement[composite[t, id[y], t]]], t → intersection[Di, x]] // Reverse) /. y → V

Out[11]= subclass[intersection[x, composite[intersection[Di, inverse[x]], cover[x]]], Id] == True

In[12]:= subclass[
               intersection[x_, composite[intersection[Di, inverse[x_]], cover[x_]]], Id] := True
```

Theorem.

```
In[16]:= SubstTest[implies, subclass[u, v], subclass[composite[u, w], composite[v, w]],
  {u → cover[x], v → intersection[Di, x, complement[composite[
    intersection[Di, x], id[y], intersection[Di, x]]], w → id[y]]} // Reverse
```

```
Out[16]= subclass[composite[cover[x], id[y]], cover[composite[x, id[y]]] == True
```

```
In[17]:= subclass[composite[cover[x_], id[y_]], cover[composite[x_, id[y_]]] := True
```

Theorem. Dual result.

```
In[25]:= (Map[subclass[composite[cover[w], id[y]], inverse[#]] &,
  SubstTest[cover, inverse[t], t → composite[w, id[y]]] // Reverse) /. w → inverse[x]
```

```
Out[25]= subclass[composite[id[y], cover[x]], cover[composite[id[y], x]] == True
```

```
In[26]:= subclass[composite[id[y_], cover[x_]], cover[composite[id[y_], x_]] := True
```

Theorem. The restriction of a cover relation is contained in the cover relation of a restriction.

```
In[28]:= SubstTest[implies, and[subclass[u, v], subclass[v, w]],
  subclass[u, w], {u → composite[id[x], cover[y], id[z]],
  v → composite[cover[composite[id[x], y], id[z]],
  w → cover[composite[id[x], y, id[z]]]} // Reverse
```

```
Out[28]= subclass[composite[id[x], cover[y], id[z]], cover[composite[id[x], y, id[z]]] == True
```

```
In[29]:= subclass[composite[id[x_], cover[y_], id[z_]],
  cover[composite[id[x_], y_, id[z_]]] := True
```