a conditional fixed point rule

Johan G. F. Belinfante and William Drobny
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```
In[1]:= (* SetDirectory["l:"]; *) << goedel.08jun17a; << tools.m

:Package Title: goedel.08jun17a                  2008 June 17 at 1:00 p.m.

It is now:  2008 Jun 18 at 9:34

Loading Simplification Rules

TOOLS.M                                      Revised 2008 May 17

weightlimit = 40
```

summary

A new conditional rewrite rule is derived which is analogous to an existing one.

derivation

Lemma.

```
In[7]:= SubstTest[implies, subclass[x, t],
          equal[fix[composite[x, inverse[t]]], range[x]], t → inverse[y]] // Reverse

Out[7]= or[equal[fix[composite[x, y]], range[x]], not[subclass[x, inverse[y]]]] == True

In[8]:= or[equal[fix[composite[x_, y_]], range[x_]], not[subclass[x_, inverse[y_]]]] := True
```

Theorem. (A new conditional rewrite rule.)

```
In[9]:= implies[subclass[x, inverse[y]], equal[fix[composite[x, y]], range[x]]]

Out[9]= True

In[11]:= fix[composite[x_, y_]] := range[x] /; simplify && subclass[x, inverse[y]]
```

an unconditional rule

The simplify flag is turned off in this section.

```
In[12]:= simplify = False;
```

An unconditional rewrite rule analogous to the following existing rule will now be derived.

```
In[15]:= fix[composite[wf[x], Di]]

Out[15]= range[wf[x]]
```

Theorem.

In[13]:= **SubstTest[union, fix[t], fix[composite[Di, t]], t → wf[x]] // Reverse**

Out[13]= fix[composite[Di, wf[x]]] == domain[wf[x]]

In[14]:= **fix[composite[Di, wf[x_]]] := domain[wf[x]]**