More Miscellanea

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Abstract

This theory is for miscellanea which depend upon well-founded set theory with urelements (GSU). It also has misc1 as a parent.

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http://www.rbjones.com/rbjpub/pp/doc/t043.pdf

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References

[1] Roger Bishop Jones. A Higher Order Theory of Well-Founded Sets (with Urelements). *RBJones.com*, 2010. `http://www.rbjones.com/rbjpub/pp/doc/t042.pdf`.

[2] Roger Bishop Jones. More Miscellanea. *RBJones.com*, 2010. `http://www.rbjones.com/rbjpub/pp/doc/t025.pdf`.

1 INTRODUCTION

This document contains material which was in [2] but which depends upon GSU [1] and therefore caused all theories dependent on [2] to be rebuilt every time GSU was changed. It is moved here to reduce the rebuilding which takes place as a theory of transfinite sequences is added to GSU.

SML

```
open_theory "misc1";
force_new_theory "misc3";
new_parent "GSU";
force_new_pc "'misc3";
merge_pcs ["'savedthm_cs_∃_proof"] "'misc3";
set_merge_pcs ["misc11", "'GSU", "'misc3"];
```

2 SET THEORY

2.1 Mapping Functions over Sets

The following function makes recursive definition of functions over sets of type GS just a little more compact.

HOL Constant

$$\boldsymbol{FunImage_u} : ('a\ GSU \to 'b) \to 'a\ GSU \to ('b\ SET)$$

$$\forall f\ s\bullet\ FunImage_u\ f\ s = \{x \mid \exists y\bullet\ y \in_u s \wedge x = f\ y\}$$

$$\boldsymbol{funimage_u\text{-}fc\_lemma} =$$
$$\vdash \forall\ f\ s\ x\bullet\ x \in_u s \Rightarrow f\ x \in FunImage_u\ f\ s$$

SML

```
add_pc_thms "'misc3" [];
commit_pc "'misc3";

force_new_pc "misc3";
merge_pcs ["misc1", "'GSU", "'misc3"] "misc3";
commit_pc "misc3";
force_new_pc "misc31";
merge_pcs ["misc11", "'GSU", "'misc3"] "misc31";
commit_pc "misc31";

set_flag("subgoal_package_quiet", false);
```

3 The Theory misc3

3.1 Parents

GSU misc1

3.2 Children

icomb

3.3 Constants

FunImage$_u$ $('a\ GSU \to 'b) \to 'a\ GSU \to 'b\ \mathbb{P}$

3.4 Definitions

FunImage$_u$ $\vdash \forall\ f\ s\bullet\ FunImage_u\ f\ s = \{x | \exists\ y\bullet\ y \in_u s \wedge x = f\ y\}$

3.5 Theorems

funimage$_u$_fc_lemma
$\vdash \forall\ f\ s\ x\bullet\ x \in_u s \Rightarrow f\ x \in FunImage_u\ f\ s$

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