Theory Vocabularies

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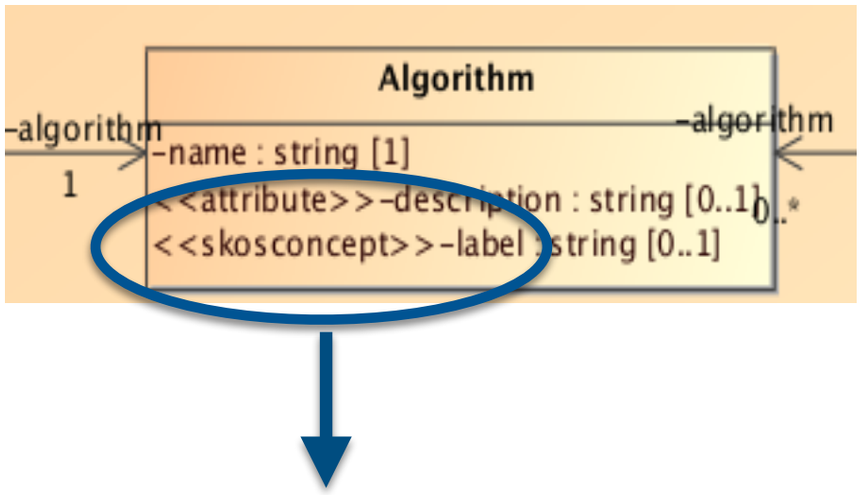
Zakaria Meliani, Emeric Bron, Hervé Wozniak

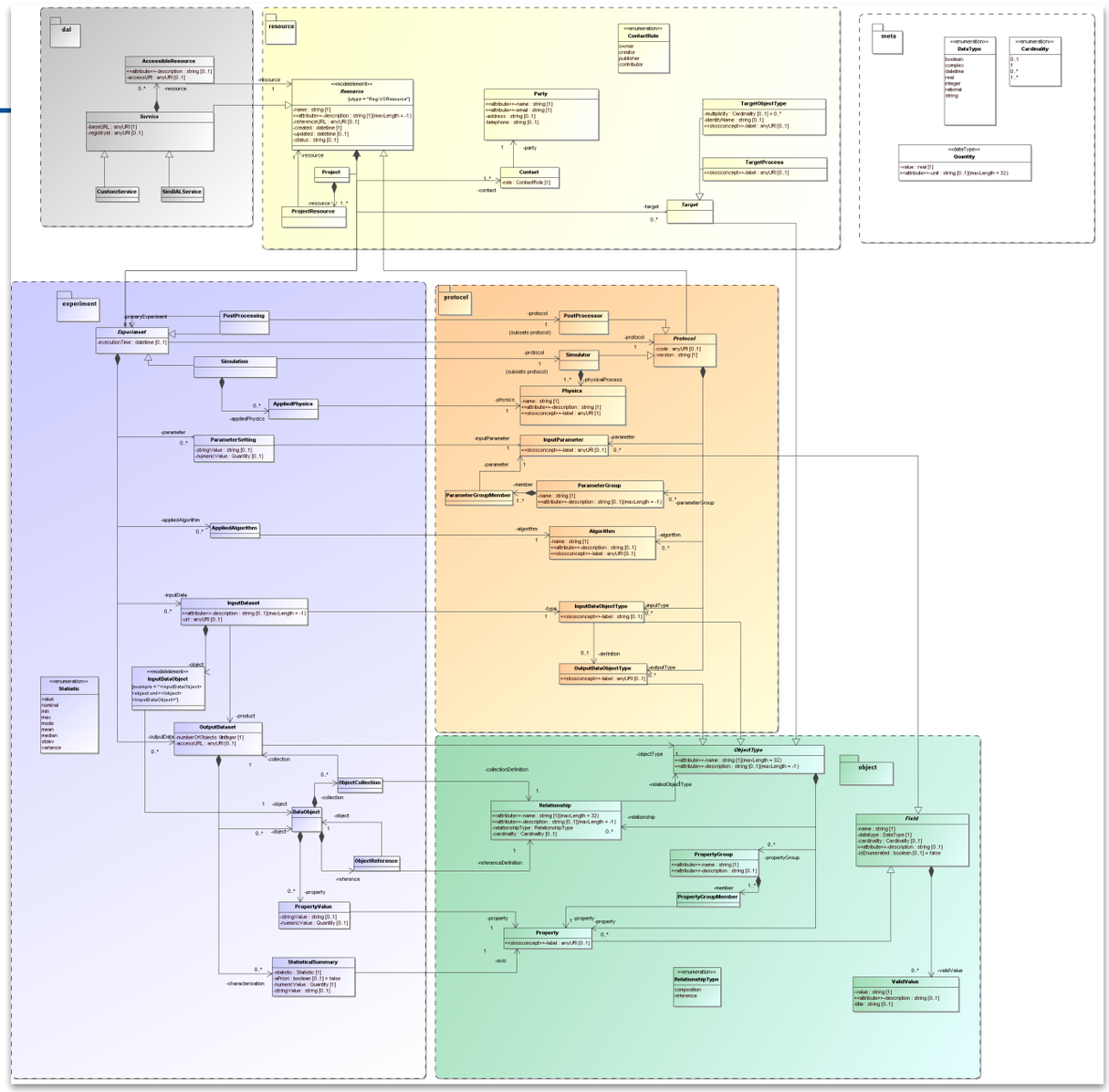
InterOp - College Park - 8-10 November 2018

Simulation Data Model (SimDM)



Skos concept attribute

- **SKOS** (Simple Knowledge Organization System) is a W3C standard using the Resource Description Framework (RDF)
- Recommended by the semantic IVOA WG
- Used in the Simulation Data Model to tag concepts



Several vocabularies

- **Algorithms**
  Ex: Runge-Kutta, Burlish-Stoer, …

- **Physical processes**
  Ex: turbulence, gravitation, …

- **Physical quantities**
  Ex: Velocity, Mass, …

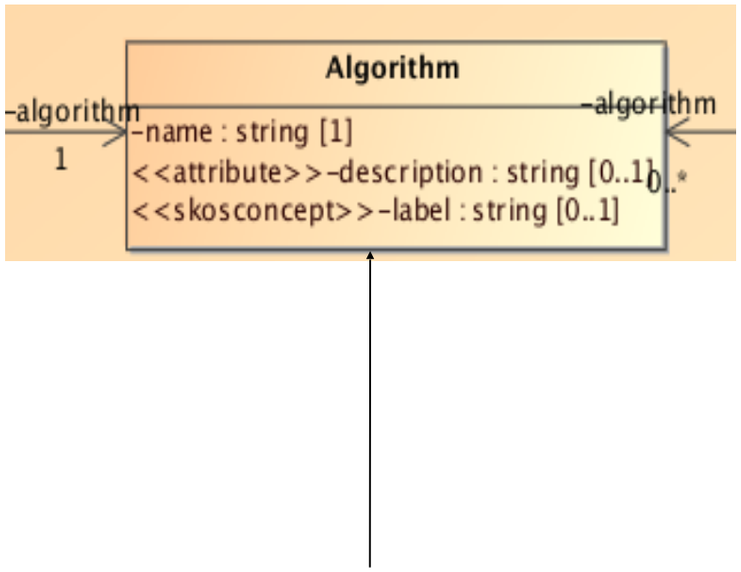
- **Data Objects Types**
  Ex: mesh cell, …

- **Astronomical Objects**
  ➔ comes from the OWL thesaurus developed by Semantics W.G. (S. Derrière)

~ 700 concepts

SKOS Concepts

Each concept is identified by a **persistent URI**



http://purl.obspm.fr/vocab/Algorithms/ForwardTimeCentralSpace

Pref: Forward-Time Central Space
ALT: FTCS
Broader: Finite Difference
Related: Lax-Friedrichs

Forward-Time Central-Space

Finite difference method used to solve parabolic partial differential equations. The method is first-order, explicit and conditionally stable ("Computational Fluid Mechanics and Heat Transfer 2nd ed.", John C. Tannehill, Dale A. Anderson, Richard H. Pletcher, 1997).

http://purl.obspm.fr/vocab/Algorithms/ForwardTimeCentralSpace

AltLabels
FTCS (en)

Broader concepts
Algorithm
Finite Difference

Broader Transitive concepts
Algorithm
Finite Difference

Related concepts
Lax-Friedrichs

Persistent URI

- Until 2016, we used **purl.org**

- We have created our own PURLS :
  - purl.obspm.fr

- Naming pattern is :

  - http://purl.obspm.fr/ConceptName

- ConceptName is prefLabel value

① Need to change: remove the *obspm* ⟶ IVOA

- Identify the **official** vocabularies with **IVOA domain**
- Independent of the place where vocabularies are developed

② Semantics W.G. wants to publish IVOA vocabularies on a web page

ivoa.net/vocabularies

Actions done

① All URIs of Theory vocabularies have been changed in:

ivoa.net/vocabularies/theory/Vocabulary/Concept

② Can provide vocabulary files to be published on Semantics dedicated page

Official vocabularies for Theory at: ivoa.net/rdf

Example of vocabularies:

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<rdf:RDF¬
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Δ  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"¬
Δ  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#">¬
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Δ  <skos:prefLabel xml:lang="en">Algorithm</skos:prefLabel>¬
Δ  <skos:definition xml:lang="en">Vocabulary top concept</skos:definition>¬
Δ  <skos:inScheme rdf:resource="http://ivoa.net/vocabularies/theory/Algorithms/Scheme"/>¬
Δ  <skos:narrower rdf:resource="http://ivoa.net/vocabularies/theory/Algorithms/AlternatingDirectionImplicit"/>¬
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Δ  <skos:narrower rdf:resource="http://ivoa.net/vocabularies/theory/Algorithms/CrankNicolson"/>¬
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Δ  <skos:narrower rdf:resource="http://ivoa.net/vocabularies/theory/Algorithms/EscapeProbability"/>¬
Δ  <skos:narrower rdf:resource="http://ivoa.net/vocabularies/theory/Algorithms/ExactRadiativeTransferMethod"/>¬
Δ  <skos:narrower rdf:resource="http://ivoa.net/vocabularies/theory/Algorithms/FastMultipoleMethod"/>¬
Δ  <skos:narrower rdf:resource="http://ivoa.net/vocabularies/theory/Algorithms/FiniteVolume"/>¬
Δ  <skos:narrower rdf:resource="http://ivoa.net/vocabularies/theory/Algorithms/FokkerPlanckSolver"/>¬
Δ  <skos:narrower rdf:resource="http://i
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Δ  <skos:narrower rdf:resource="http://i
Δ  <skos:narrower rdf:resource="http://ivoa.net/vocabularies/theory/Algorithms/ParticleInCell"/>¬
Δ  <skos:narrower rdf:resource="http://ivoa.net/vocabularies/theory/Algorithms/PiecewiseParabolicMethod"/>¬
Δ  <skos:narrower rdf:resource="http://ivoa.net/vocabularies/theory/Algorithms/PiecewiseLinearMethod"/>¬
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<skos:Concept rdf:about="http://ivoa.net/vocabularies/theory/Algorithms/FourierTechnique">¬
Δ  <skos:prefLabel xml:lang="en">Fourier Technique</skos:prefLabel>¬
Δ  <skos:inScheme rdf:resource="http://ivoa.net/vocabularies/theory/Algorithms/Scheme"/>¬
Δ  <skos:narrower rdf:resource="http://ivoa.net/vocabularies/theory/Algorithms/ParticleMesh"/>¬
Δ  <skos:narrowerTransitive rdf:resource="http://ivoa.net/vocabularies/theory/Algorithms/ParticleParticleParticleMes
Δ  <skos:broader rdf:resource="http://ivoa.net/vocabularies/theory/Algorithms/Algorithm"/>¬
</skos:Concept>¬
<skos:Concept rdf:about="http://ivoa.net/vocabularies/theory/Algorithms/Godunov">¬
Δ  <skos:prefLabel xml:lang="en">Godunov</skos:prefLabel>¬
Δ  <skos:definition xml:lang="en">Finite volume method</skos:definition>¬
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Δ  <skos:broader rdf:resource="http://ivoa.net/vocabularies/theory/Algorithms/Algorithm"/>¬
Δ  <skos:broader rdf:resource="http://ivoa.net/vocabularies/theory/Algorithms/FiniteVolume"/>¬
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</skos:Concept>¬
```

Website at Paris Observatory

Discover concepts and relations:

Home Search concepts Help

This service is dedicated to scientists and VO developers who wish to publish theoretical services described by the Simulation DataModel.

As described in the IVOA standard, Simulation Data Model, registrations of theoretical services, require to provide several URIs corresponding to semantics keywords describing services and simulations. VO-Theory concepts are based on SKOS description as recommended by the IVOA Semantic Working Group.

This website is dedicated to the discovery of these URIs. Navigate through the broader, narrower, related terms to discover the most precise concept you wish.

To suggest new concepts or corrections, contact : support.votheory@obspm.fr.

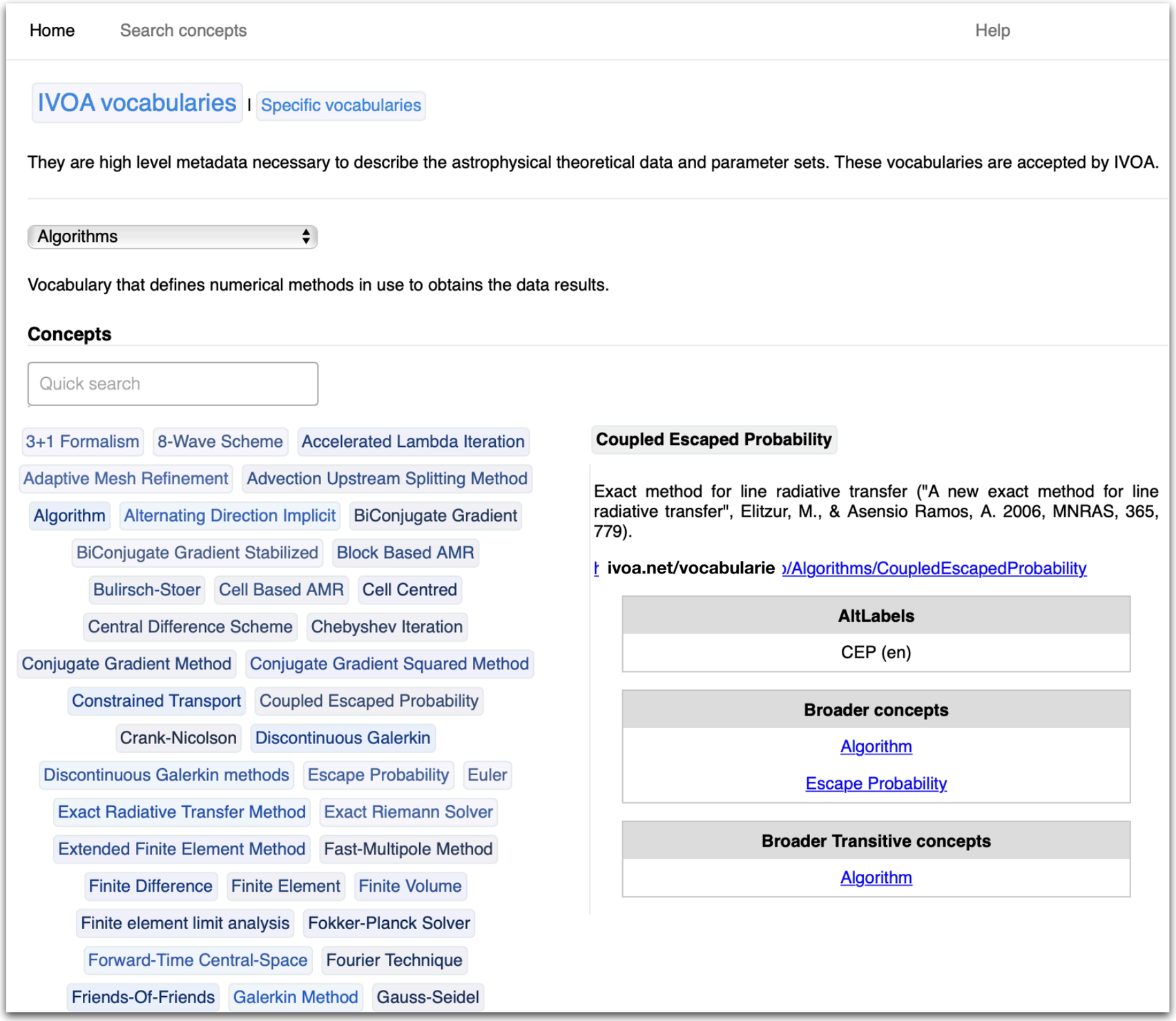
Search concepts

David Languignon [1], Franck Lepetit [1], Nicolas Moreau [1], Zakaria Meliani [2], Fabrice Roy [2], Norman Gray [3], Sebastien Derriere [4], Carlos Rodrigo [5],

[1]LERMA - Obs. Paris,[2]LUTH - Obs. Paris,[3]University of Glasgow,[4]Centre de Données astronomiques de Strasbourg,[5]CAB/INTA-CSIC/SVO

Website at Paris Observatory

Discover concepts and relations:



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Discover concepts and relations:

This XML file does not appear to have any style information associated with it. The document tree is shown below.


```
▼<rdf:RDF xmlns:skos="http://www.w3.org/2004/02/skos/core#" xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#" xmlns:rdf="http://www.w3.org/1999/02/22-
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    <skos:prefLabel xml:lang="en">Coupled Escaped Probability</skos:prefLabel>
   ▼<skos:definition xml:lang="en">
      Exact method for line radiative transfer ("A new exact method for line radiative transfer", Elitzur, M., & Asensio Ramos, A. 2006, MNRAS, 365,
      779).
    </skos:definition>
    <hasVersion xmlns="http://purl.obspm.fr/dc/terms/" rdf:datatype="http://www.w3.org/2001/XMLSchema#int">8</hasVersion>
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  </skos:Concept>
</rdf:RDF>
```


Note: purl.obspm.fr will be replaced by ivoa.net/vocabularies on this page

Redirection

IVOA

ivoa.net/rdf/theory

List of vocabularies:
- Algorithms
- Data Object Types
- Physical processes
- Physical quantities
- Astronomical Objects

PARIS

http://votheory.obspm.fr

Copy of vocabularies
+ **application** to:
1 - discover concept
2 - navigation in relations
3 - check existence

Redirection

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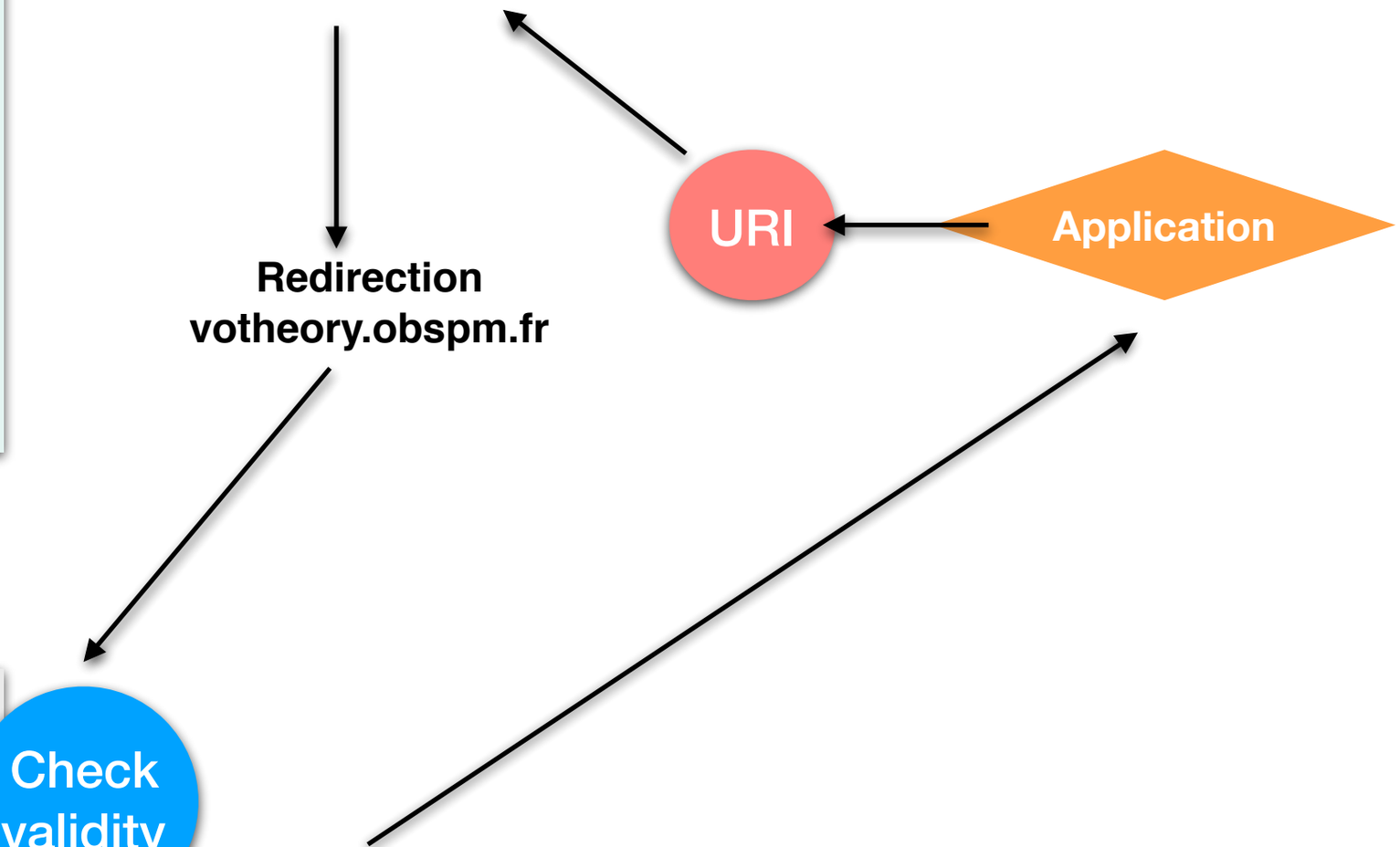

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▼<skos:Concept rdf:about="http://purl.obspm.fr/vocab/Algorithms/CoupledEscapedProbability">
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  <hasVersion xmlns="http://purl.obspm.fr/dc/terms/" rdf:datatype="http://www.w3.org/2001/XMLSchema#int">8</hasVersion>
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  <skos:broaderTransitive rdf:resource="http://purl.obspm.fr/vocab/Algorithms/Algorithm"/>
  <contributor xmlns="http://purl.obspm.fr/dc/terms/">roy</contributor>
  <creator xmlns="http://purl.obspm.fr/dc/terms/">roy</creator>
  <created xmlns="http://purl.obspm.fr/dc/terms/" rdf:datatype="http://www.w3.org/2001/XMLSchema#dateTime">2010-09-14T14:12:43Z</created>
 </skos:Concept>
</rdf:RDF>
```

Actions

Concept URIs

Can we conclude that URI is: http://ivoa.net/vocabularies/theory/Vocabulary/Concept

Note:

- web page can be anything (ivoa.net/rdf or anything)
- need a QUICK answer
  - presently, SimDM is incorrect on this aspect
  - need this conclusion for SimDM 1.1

Re-direction

- Less urgent
- David Languignon and Nicolas Moreau will provide the code for the redirection