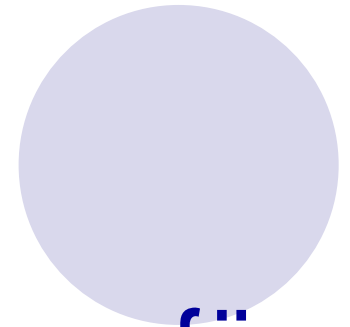
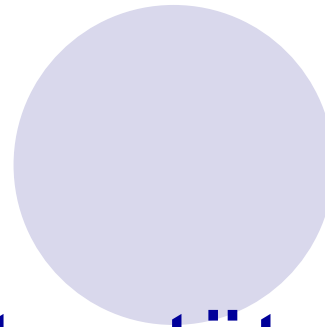
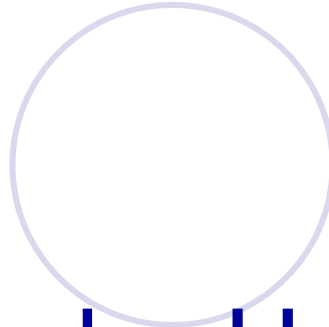
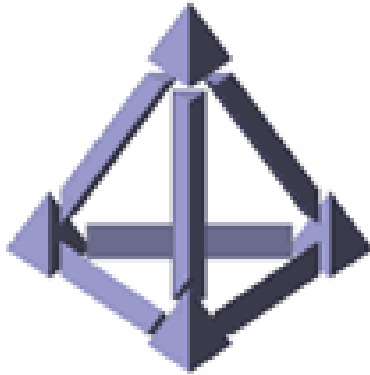




Uni Magdeburg

Institut für verteilte Systeme

Seminar "Web-Qualitätsmanagement"



Semantische Unterstützung für

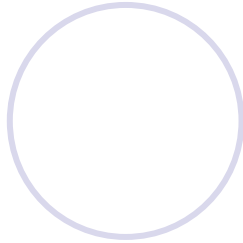
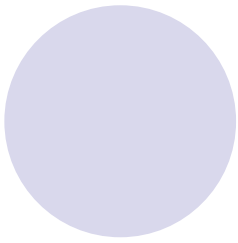
GEODISE

Grid Enabled Optimisation and Design Search in Engineering

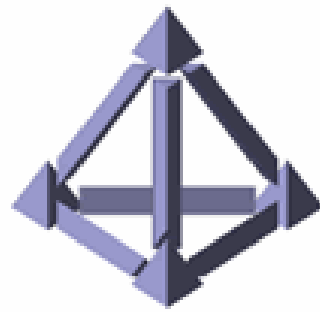
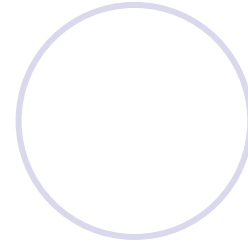
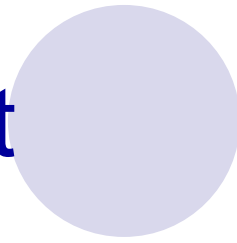
Seminarleiter: Prof. Dr. Reiner Dumke

von Hashem Yazbek

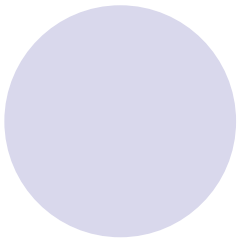
22.06.2005



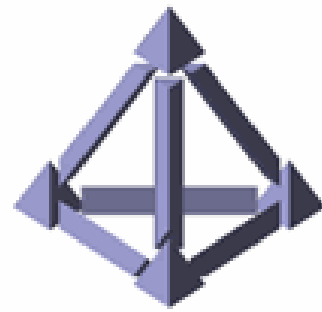
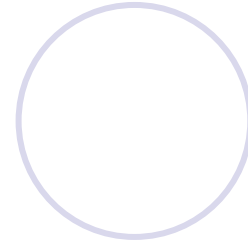
Inhalt



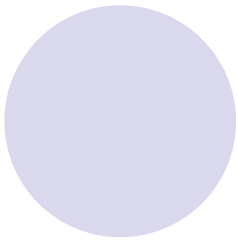
- Begriffsklärung
- Einführung
- Architektur des Semantic Grid für EDSO
- Engineering-Ontologien für Geodise
- Beispiele für semantische Unterstützung für ontologie-basierte PSE (*Problem Solving Environment*) in Geodise
 - Ontologie-basierter Domänen Script Editor
 - Ontologie-getriebene Formen
- Zusammenfassung



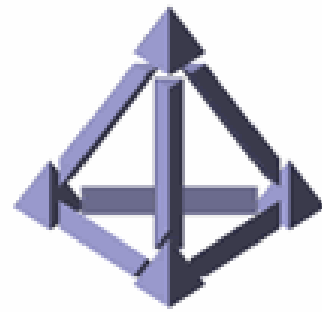
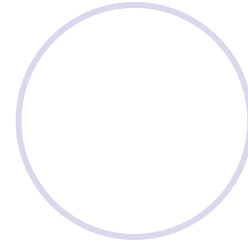
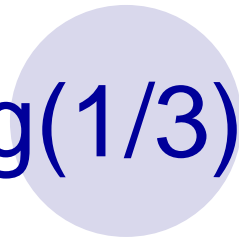
Begriffsklärung



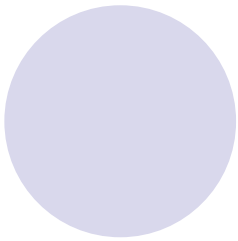
- Geodise: Grid Enabled Optimisation and Design Search in Engineering.
- Man darf Geodise nicht mit dem Begriff „Geodäsie“ verwechseln!
- Projekt "Geodise" ist ein Grid-System, das speziell für den Bereich der Optimierung entwickelt wurde.



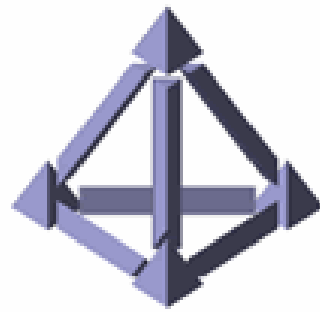
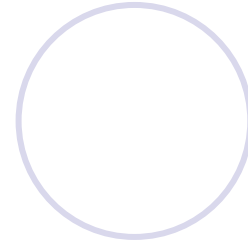
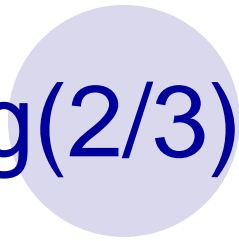
Einführung(1/3)



- große Anstrengungen im Bereich des Grid Computing
- Probleme bei der Entwicklung neuer Technologien
 - Koordination der Ressourcenteilung
 - Bildung von dynamischen, virtuellen Organisationen
- Das Grid als eine Vision des E-Science
- Grid-Technologien → Open Grid Services Architecture (OGSA)



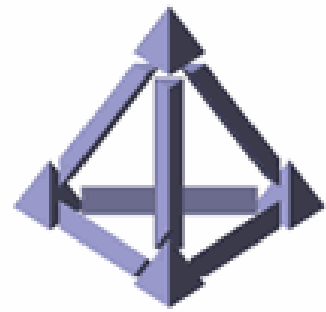
Einführung(2/3)



- Lücke zwischen dem Angestrebten und der Vision des E-Science
 - hoher Grad eines easy-to-use
 - möglichst hohe Automatisierung
 - Bildung von flexiblen Kollaborationen
 - Semantic Grid
- Technologien zur Entwicklung des Semantic Grid
 - das Semantic Web
 - angewandte Knowledge-Technologien



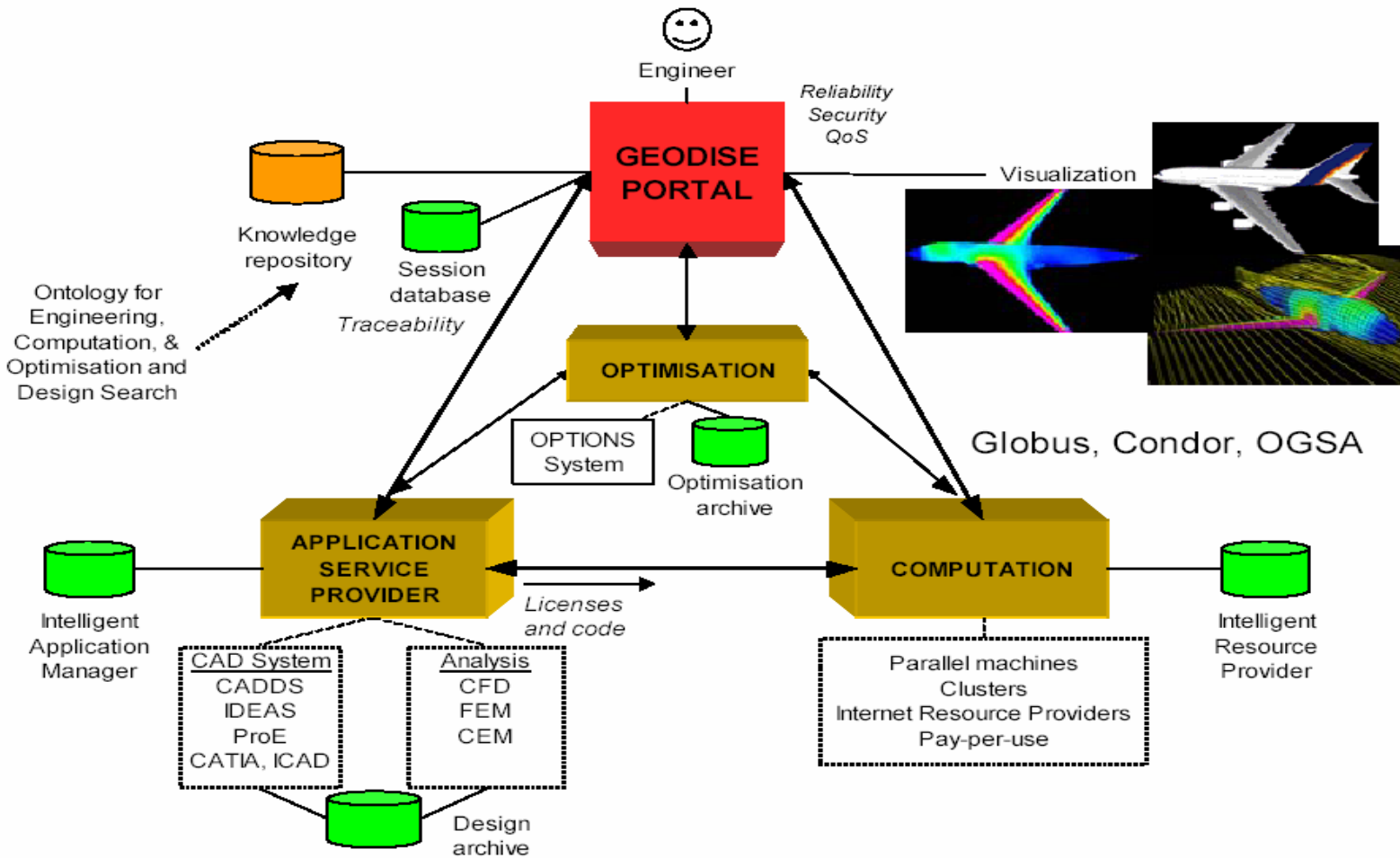
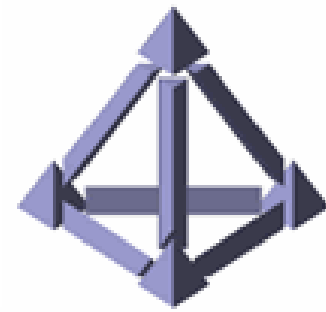
Einführung(3/3)



- Technologien des Semantic Grid helfen beim *Engineering Design Search and Optimisation (EDSO)*
 - EDSO-Ressourcen erzeugen →
 - gemeinsame Benutzung
 - nahtlose Wiederverwendung
 - EDSO im Grid ermöglichen
semantische Informationen
→ EDSO-Ressourcen

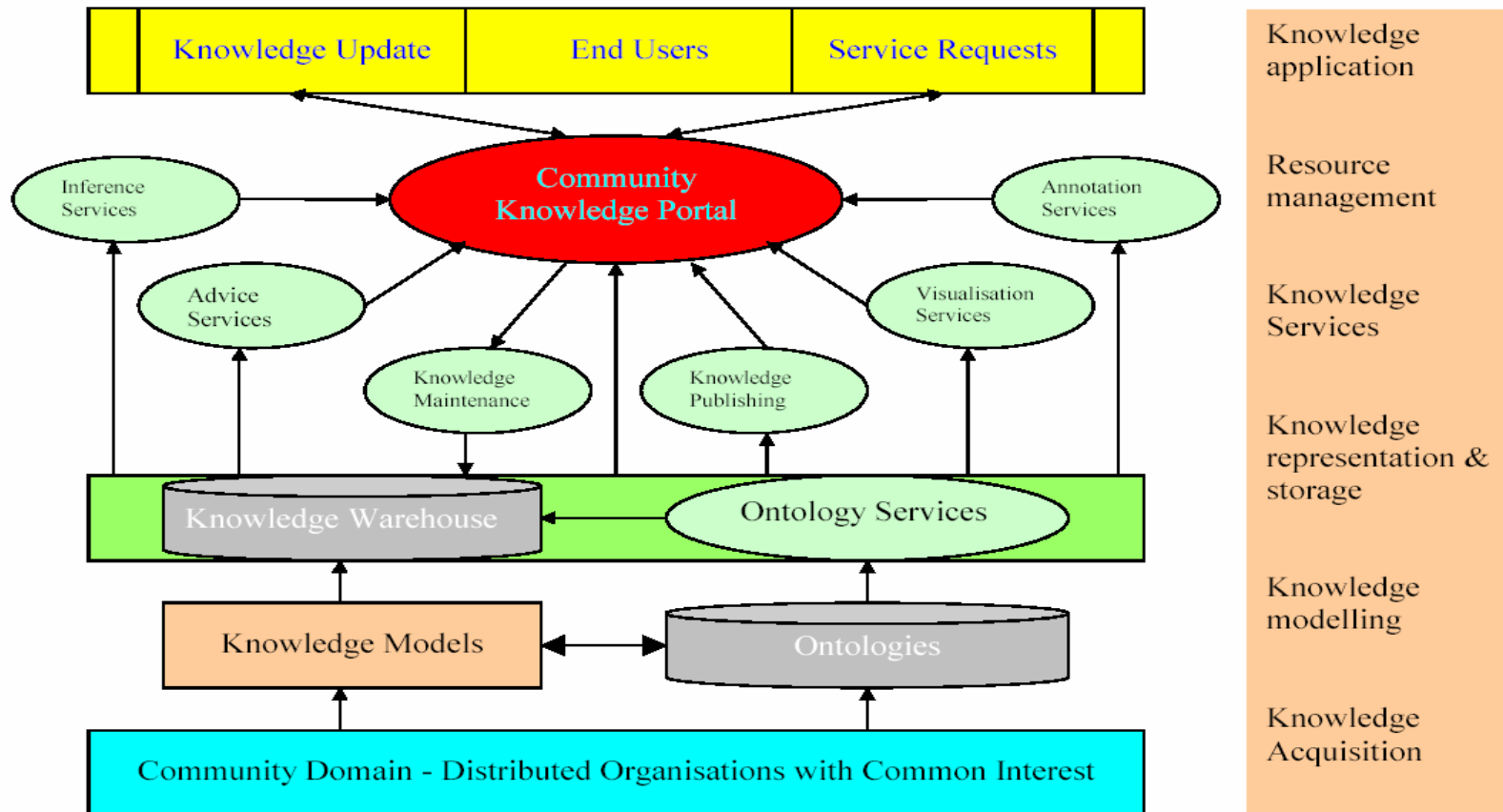
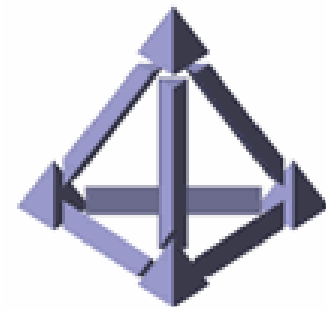


Architektur des Semantic Grid für EDSO(1/2)





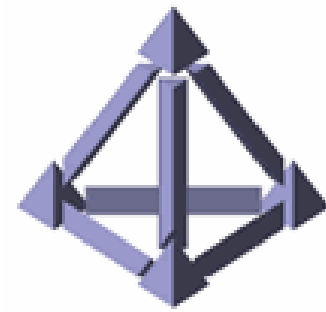
Architektur des Semantic Grid für EDSO(2/2)



integriertes service-orientiertes Framework für verteiltes Wissensmanagement



Engineering-Ontologien für Geodise(1/2)



The screenshot displays an ontology editor interface. On the left, a tree view shows a hierarchy of classes. The 'task #1' class is expanded, showing its subclasses: DesignOfExperiment #1, dataManagement #1, designOfExperiment #1, geometryDesign #1, meshGeneration #1, objectiveFunctionAnalysis #1 (highlighted), optimisation #1, post processing #1, preprocessing #1, responseSurfaceModelling #1, and visualisation #1. The 'toolPackage #1' class is also visible. On the right, a table lists restrictions for the 'task #1' class.

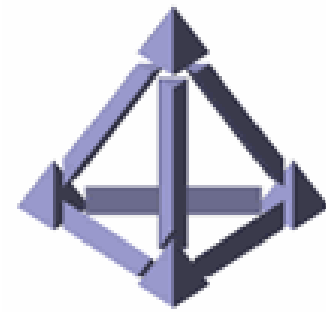
Classes		
task #1		

Restrictions		
type	property	fill
has-class	has input #1	meshFile #1
has-class	has input #1	journalFile #1
has-class	has output #1	solverAnalysisFile #1
has-class	performed by #1	solverAnalysisTools #1
has-class	has effect #1	ObjectiveFunctionValue #1
has-class	has effect #1	SingleRunTime #1

EDSO Task-Ontologie



Engineering-Ontologien für Geodise(2/2)



- **Ontologieservice**

EDSO Ontologien → Geodise

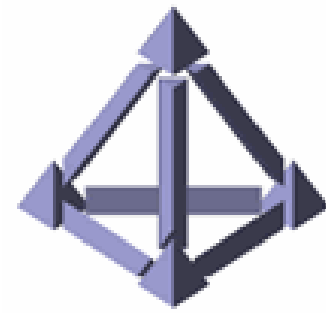
Entwicklung durch Java-Technologien

Einsatz durch Apache Tomcat und Axis Technologien

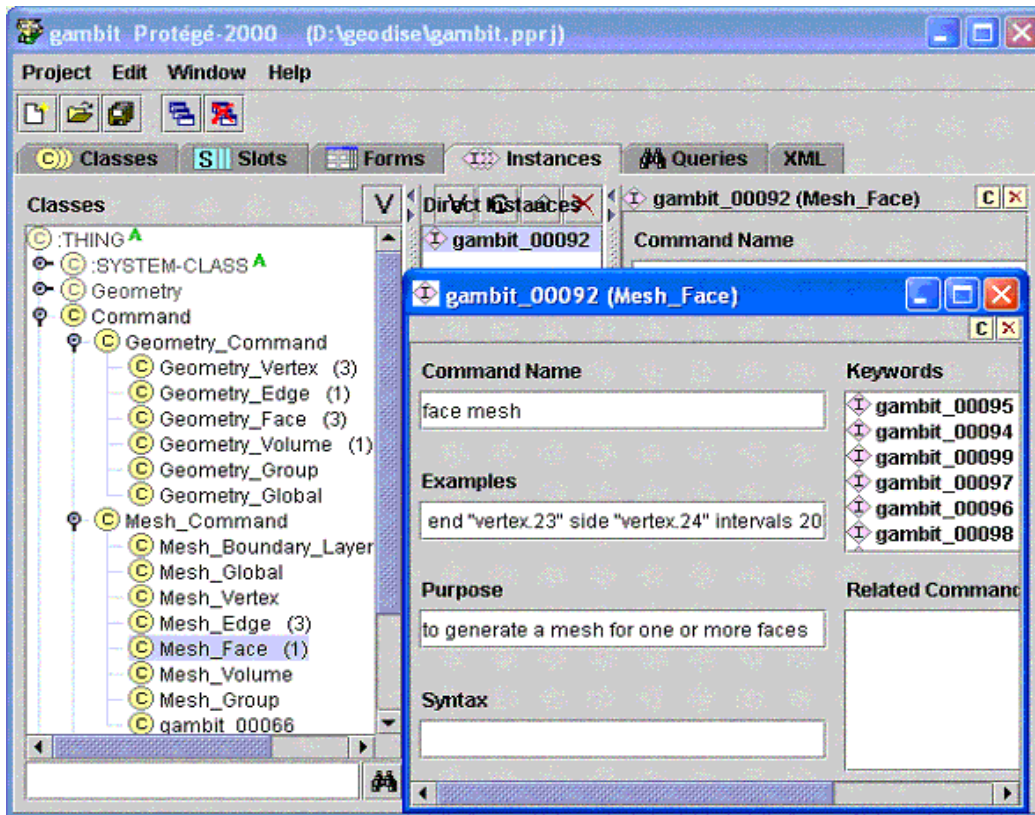
- Ein zugrundeliegendes Datenmodell
 - Ein Ontologieserver
 - FaCT-Reasoner
 - Ein Satz von User-APIs
- } → ontologische Operationen



Beispiele(1/2)



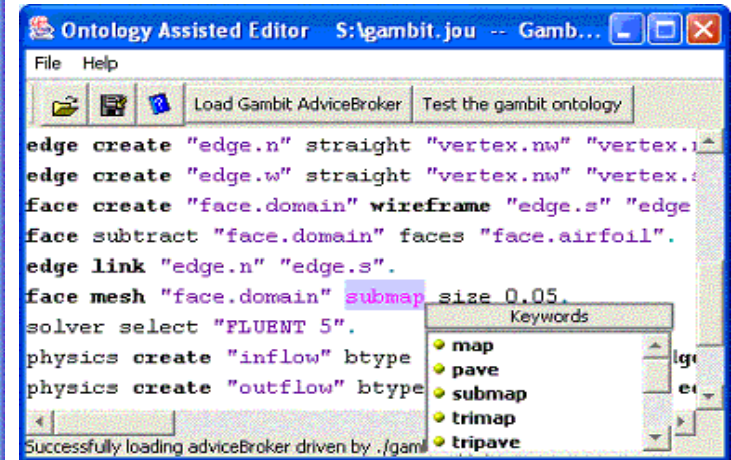
Ontologie-basierter Domänen Script Editor



Farben

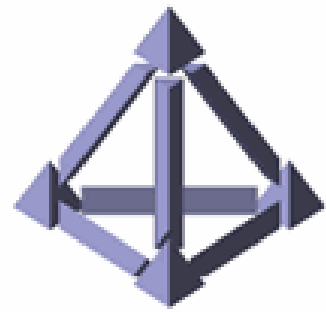
kontextsensitive Hinweise

Vervollständigung





Beispiele(2/2)



Ontologie-getriebene Formen

Matlab-Struktur in Geodise

```

standard: [1x1 struct]
modelName: 'NacelleARR'
version: '0.80'
type: 'cad'
parameterNames: {'SCARF_ANGLE' 'CENTER_OFFSET' 'REAR_EXTEND'}
inputFileName: 'nacelle.inp'
outputFileName: 'nacelle.stp'
nooffiles: 3
command: 'proe2001'
arguments: 'nacelletestp.txt -g:no_graphics'
package: [1x1 struct]
condorsub: [1x1 struct]
comment: [1x57 char]

```

name	width	breath	material_type
meaning	beam width	breath of the beam	beam material
unit	mm	mm	null
fixed	false	false	true

description	Beam design problem								
lastTimeUsed	2003-02-17T09:30:47								
timeCreated	2001-12-17T09:30:47								
user	barry								
xmlns	http://www.geodise.org/knowledge								
xmlns:xsi	http://www.w3.org/2001/XMLSchema-instance								
xsi:schemaLoca...	http://www.geodise.org/knowledge D:\geodise\XML_Templates\problem_mo.xsd								
designVariables (3)									
<input type="checkbox"/>	name	<input type="checkbox"/>	meaning	<input type="checkbox"/>	unit	<input type="checkbox"/>	limit	<input type="checkbox"/>	fixed
<input type="checkbox"/>	1	width	beam width	mm	<input checked="" type="checkbox"/>	limit	false		
<input type="checkbox"/>	2	breath	breath of the beam	mm	<input checked="" type="checkbox"/>	limit	false		
<input type="checkbox"/>	3	material_type	beam material	null	<input checked="" type="checkbox"/>	limit	true		
parameters (3)									
<input type="checkbox"/>	name	<input type="checkbox"/>	unit	<input type="checkbox"/>	meaning	<input type="checkbox"/>	value		
<input type="checkbox"/>	1	length	mm	length of the beam	250				
<input type="checkbox"/>	2	force	N	force on the tip of the beam	5000.0				
<input type="checkbox"/>	3	density	kg/m3	density of the beam material	7850.0				
objectiveFunction									
<input type="checkbox"/>	objective	minimize the cross-section area of the beam							
<input type="checkbox"/>	codeURL	d:\geodise\beam1.s.exe							
<input type="checkbox"/>	singleRunTime	PT30S							
<input type="checkbox"/>	estimatedLower...	20							
<input type="checkbox"/>	estimatedUpper...	30							
<input type="checkbox"/>	singlePeak	true							
<input type="checkbox"/>	optimisation	not defined							

material_type
beam material
null

discreteLimit

name	unit	meaning	value
length	mm	length of the beam	250
force	N	force on the tip of the beam	5000.0
density	kg/m3	density of the beam	7850.0

Objective function

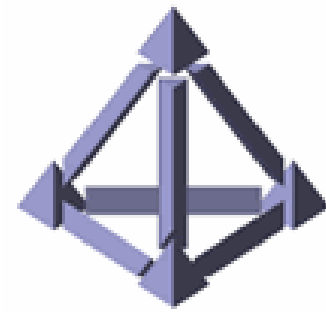
objective	codeURL	singleRunTime	estimatedLower...	estimatedUpper...
minimize the cross...	d:\geodise\beam1.s.exe	PT30S	20	30

Hashem Yazbek

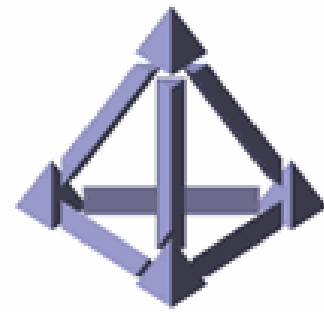
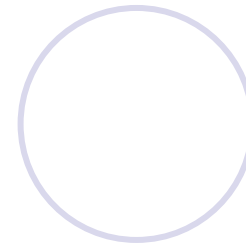
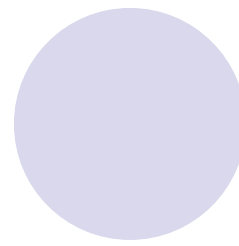
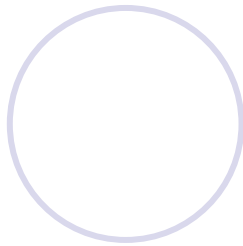
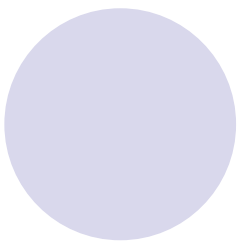
Semantische Unterstützung für GEODISE



Zusammenfassung



- Was ist GEODISE? → Grid-Projekt
- Wozu? → Optimierung
- Wie? → Semantic Grid
 - Semantic Web, Knowledge Technologien
 - Ontologien
- Die Semantik ist nicht nur ein Wünschenswert, sondern auch notwendig für E-Science.



Vielen Dank für Ihre
Aufmerksamkeit!

Fragen?!