POSL

Parallel Oriented Solver Language

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Introduction

Presenting the goals of the thesis:
POSL and performed studies using classic problems as benchmark

Introduction

Didactically presenting the problem making an analogy with building cars

The business starts as a little factory building rudimentary planes → the simple algorithm

ANALOGY

Factory ↔ Language

Problem: Transportation ↔ CSP

Product (solution): Cars ↔ Solvers

Introduction

The business needs to grow, so two alternatives:

1. Building a bigger factory ↔ Creating an algorithm allowing to solve more complex instances (sequential approach)
2. Building more little factories (franchises) ↔ The same algorithm using more computation resources (parallel approach)

Introduction

Time + competitors = new version !

The step towards a new version can be (in the best case) changing something in one of the departments (pneumatics, for example)

It implies changing this department in every little factory.

FISRT GOAL of POSL:

It propose creating little factories specialized on a specific part of the car, and then an assembly plant to join them.

POSL presentation

Presenting each stage of the building process using POSL, still making the analogy with cars:

MODULES

Operation modules

Little factories building specifics pieces (using rubber as input, create pneumatics as output) ↔ simple functions (using a vector as input it returns a set of vectors)

Communication modules

Storage facilities to receive pieces from other factories ↔ functions able to receive information (vectors, set of vectors)

POSL presentation

OPERATORS

Assembly plants ↔ joining the modules (examples)

Abstract solver concept

Imagine mobile assembly plants: they are created to receive different types of generic (not specific) pieces and assembly them ↔ Operators are used not using concrete modules, but abstract modules, characterized only by their signatures (examples, code and advantages)

Introducing directly the stage of instantiating solvers (examples and code)

POSL presentation

THE MAIN ADVANTAGE OF POSL:
Communication

A simple language to create communication strategies, capable to define/express:

What to communicate: There exists different types of communication modules, able to receive any kind of information

Where to communicate: They can be combined with other modules using operators

When to communicate: Abstract solvers can be configured using simple Boolean expressions together with operator to indicate code bifurcations

How to communicate: Different connection topologies can be created using communication operators

(examples and code)

POSL presentation

Summarizing the characteristics of POSL

Communication strategies study

Second Goal of the presentation

Presenting a study of different communication strategies applied to some classical constraint satisfaction problems

Presenting each problem

Parallel without communication

Presenting abstract solvers for each problem

Explaining some characteristic (reset for Costas, tabu for Golomb, etc.)

Presenting results

Simple communication

Presenting abstract solvers for each problem

Explaining some characteristic (variant A and B for Costas, etc.)

Presenting results

Local minimum evasion

Presenting the abstract solver for Golomb Ruler

Explaining why this strategy for it.

Presenting results

Standard – Companion strategy

Presenting abstract solvers for each problem

Explaining some characteristic (modules of companion solvers)

Presenting results

Communication strategies study

Conclusions of the study

Conclusions and future works