Computing Domain Abstractions for Optimal Classical Planning with Counterexample-Guided Abstraction Refinement

Raphael Kreft, Clemens Büchner, Silvan Sievers, Malte Helmert

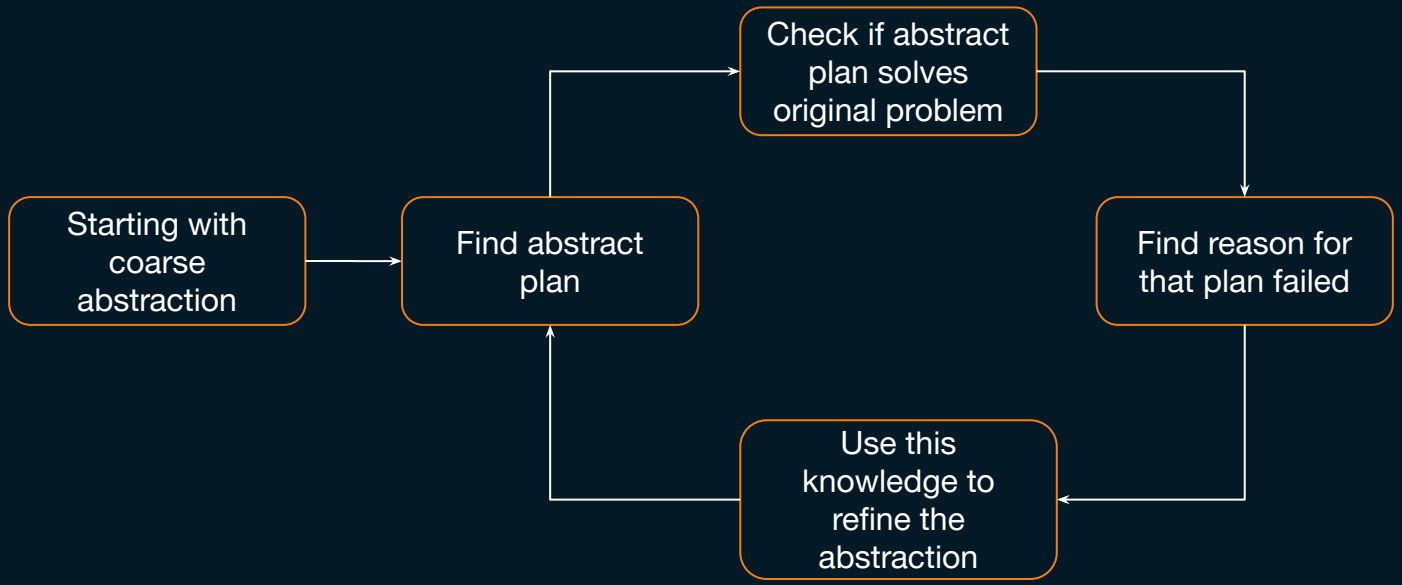
{L(eft), R(ight), T(ruck)}

{L(eft), R(ight)}

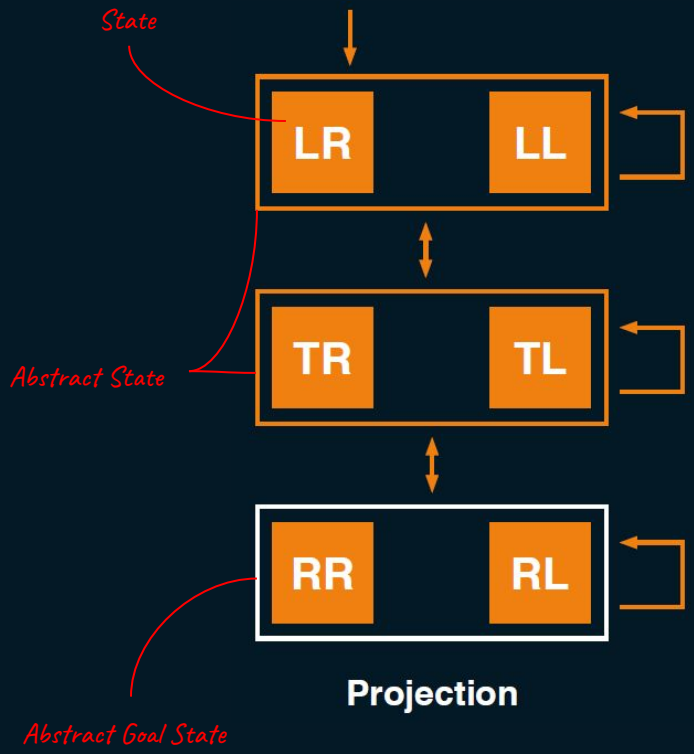
City L

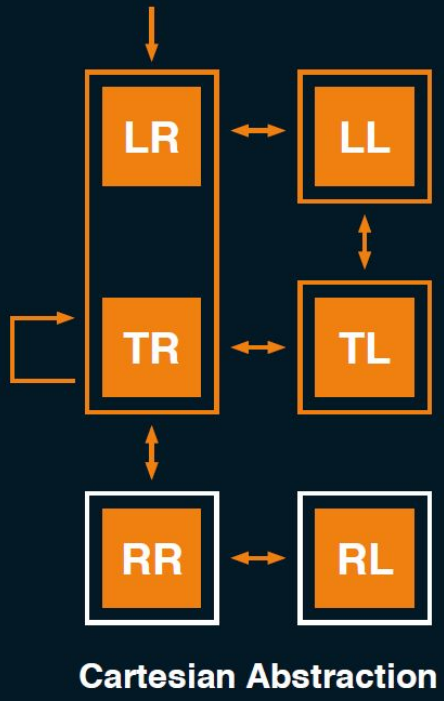
City R

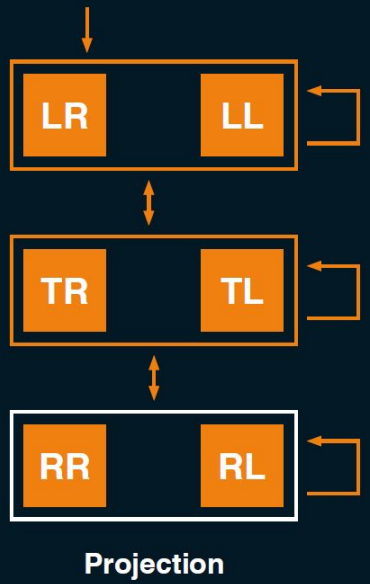
Setting: Optimal Classical Planning in the SAS+ Formalism



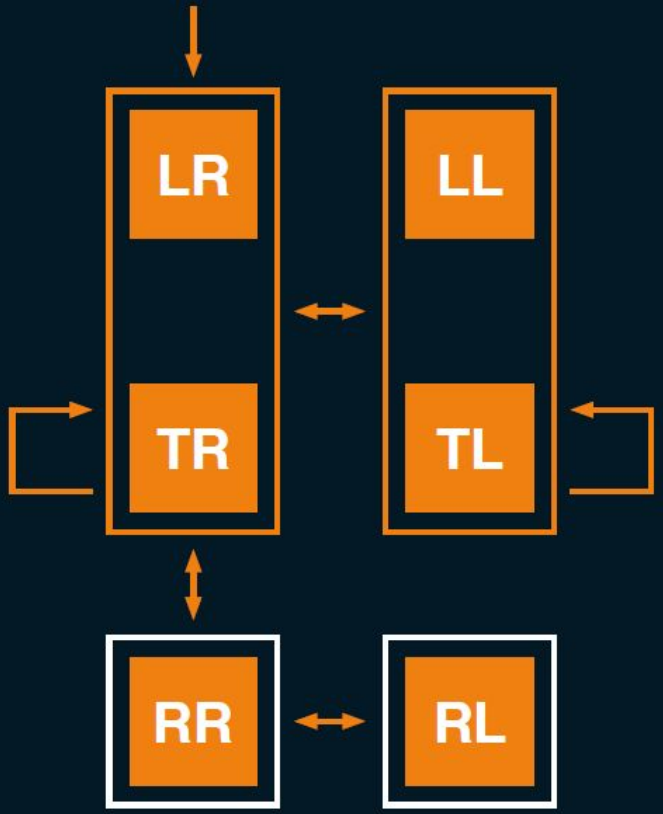
Compute Abstractions with Counterexample-Guided Abstraction Refinement


State
LR
LL
TR
TL
RR
RL
Abstract State
Abstract Goal State
Projection

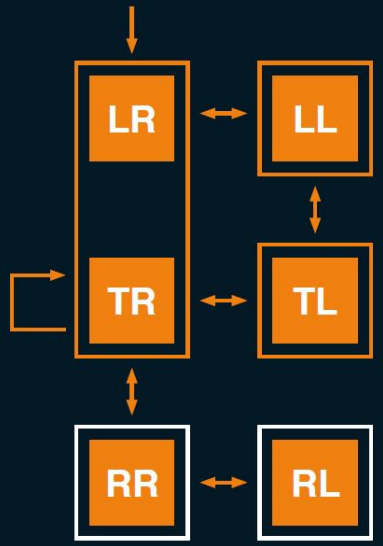

LR
LL
TR
TL
RR
RL
Cartesian Abstraction



Projection



Domain Abstraction



Cartesian Abstraction

CEGAR for Domain Abstractions

- Flaws are atoms (not variables as in Projections)
- Two strategies for choosing Flaws:

Rand

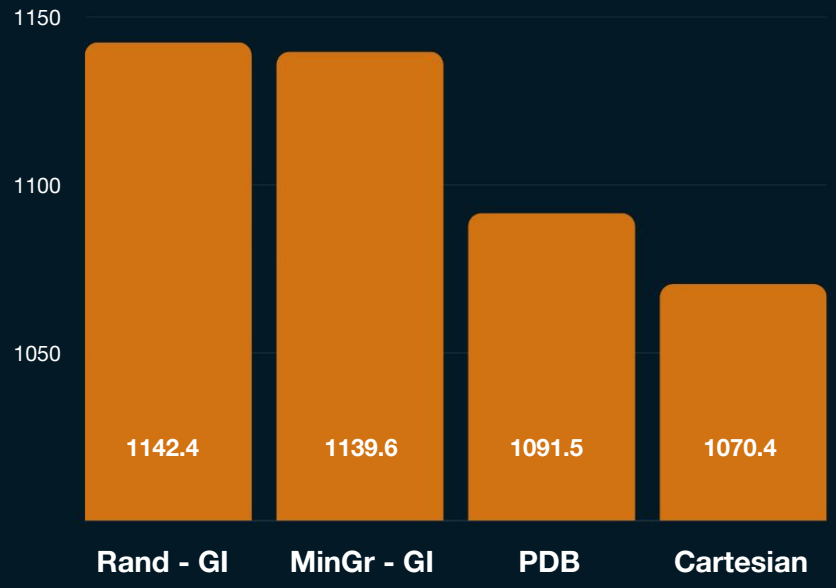
MinGrow

Constructing Collections

- Multiple Sequential CEGAR runs
- Combined using Saturated Cost Partitioning
- Using different diversification strategies:

Blacklisting

Initialisation


1150
1100
1050
1142.4
1139.6
1091.5
1070.4
Rand - GI
MinGr - GI
PDB
Cartesian

Domain Abstractions

Sweet spot between projections and cartesian abstractions?

	Rand - GI	MinGr - GI	PDB	Cartesian	coverage
Rand - GI	-	14	28	38	1142.4
MinGr - GI	14	-	32	41	1139.6
PDB	13	9	-	33	1091.5
Cartesian	7	8	13	-	1070.4