Waste collection routing: a survey on problems and methods – Supplementary material

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Collection of instances

In this section, we list the weblinks to instances which were given in papers mentioned in the survey. We have only included links that were still working.

Citation	Link	Comment	Section
Cortinhal et al. (2016)	https://www.uv.es/belengue/mcarp/index.html	adapted	Scope
Gläser (2022)	https://www.sciencedirect.com/science/article/abs/pii/S0377221721001739, https://data.mendeley.com/datasets/p337573636/1		LRP
Vidović et al. (2016)	https://drive.google.com/drive/u/0/folders/0B2MP23VH-lypRERoOHEtRXhLSTA?usp=sharing		LRP
Ma et al. (2021)	http://prodhonc.free.fr/Instances/instances_us.htm		LRP

Pourhejazy et al. (2021)	https://doi.org/10.1016/j.tre.2020.102169		GRP
Bach et al. (2016)	Prins and Bouchenoua Prins and Bouchenoua (2005): https://www.sintef.no/projectweb/top/nearp/cbmix-benchmark/. Bach et al. Bach et al. (2013): https://www.sintef.no/projectweb/top/nearp/bhw-benchmark/. Bosco et al. Bosco et al. (2013) https://www.sintef.no/projectweb/top/nearp/mggdb-mgval/mgval_25/, https://www.sintef.no/projectweb/top/nearp/mggdb-mgval/mgval_30/, https://www.sintef.no/projectweb/top/nearp/mggdb-mgval/mgval_35/, https://www.sintef.no/projectweb/top/nearp/mggdb-mgval/mgval_40/, https://www.sintef.no/projectweb/top/nearp/mggdb-mgval/mgval_45/, https://www.sintef.no/projectweb/top/nearp/mggdb-mgval/mgval_40/, and https://www.sintef.no/projectweb/top/nearp/mggdb-mgval/mggdb_25/, https://www.sintef.no/projectweb/top/nearp/mggdb-mgval/mggdb_30/, https://www.sintef.no/projectweb/top/nearp/mggdb-mgval/mggdb_35/, https://www.sintef.no/projectweb/top/nearp/mggdb-mgval/mggdb_40/, https://www.sintef.no/projectweb/top/nearp/mggdb-mgval/mggdb_45/, https://www.sintef.no/projectweb/top/nearp/mggdb-mgval/mggdb_50/.		GRP
Willemse and Joubert (2016)	Instances are given in the supplementary data, https://doi.org/10.1016/j.cor.2015.10.010		ARP
Kiilerich and Wøhlk (2018)	http://www.optimization.dk/		ARP
Cortinhal et al. (2016)	http://www.uv.es/belengue/mcarp/index.html	adapted	ARP
Wøhlk and Laporte (2022)	http://www.optimization.dk/skips/		PDP
Lavigne et al. (2022)	http://www.vrp-rep.org/datasets/item/2021-0007.html		VRP
Zhou et al. (2022)	http://www.vrp-rep.org/references/item/solomon-1987.html		VRP
Qiao et al. (2020)	http://www.bernabe.dorronsoro.es/vrp/	adapted	VRP
Arnold et al. (2019)	http://vrp.atd-lab.inf.puc-rio.br		VRP
Lan et al. (2022)	https://github.com/Joe12138/Large-Scale-WCP-Dataset-For-M3CVRP		VRP
Aliahmadi et al. (2021)	http://www.vrp-rep.org/datasets/item/2021-0001.html		VRP

Wy et al. (2013)	http://logistics.postech.ac.kr/RR-VRPTW_benchmark.htm	VRP
Aringhieri et al. (2018)	http://www.di.unito.it/~aringhie/benchmarks.html	VRP
Henke et al. (2015)	http://www.mansci.ovgu.de/mansci/en/Research/Materials/2014-p-394.html	VRP

Literature by problem type

The following table gives an overview of all works mentioned in the survey, grouped by the chapters in which they are (primarily) mentioned.

LRP: Alumur and Kara (2007), Blazquez and Paredes-Belmar (2020), Cubillos and Wøhlk (2021), Ghiani et al. (2014b), Gläser (2022), Gläser and Stücken (2021), Govindan et al. (2022), Hemmelmayr et al. (2017, 2014), Hrabec et al. (2020), Inghels et al. (2016), Lavigne et al. (2021), Ma et al. (2021), Rabbani et al. (2019, 2021, 2020), Samanlioglu (2013), Vidović et al. (2016), Yu et al. (2020)
GRP: Bach et al. (2016), Pourhejazy et al. (2021)
ARP: Amponsah and Salhi (2004), Babaee Tirkolaee et al. (2022, 2019, 2018), Cortinhal et al. (2016), Del Pia and Filippi (2006), Ghiani et al. (2005), Jin et al. (2021), Kiilerich and Wøhlk (2018), Moazzeni et al. (2022), Rodrigues and Soeiro Ferreira (2015), Willemse and Joubert (2016), Wøhlk and Laporte (2017, 2018, 2019), Zbib and Laporte (2020), Zbib and Wøhlk (2019)
VRP: Accorsi and Vigo (2021), Aliahmadi et al. (2021), Angelelli and Speranza (2002), Aringhieri et al. (2018), Arnold et al. (2019), Baldacci et al. (2006), Battarra et al. (2014), Beltrami and Bodin (1974), Benjamin and Beasley (2010, 2013), Bing et al. (2014), Bodin et al. (2000), Cao et al. (2021), Coene et al. (2010), De Bruecker et al. (2018), De Morais et al. (2022), Delgado-Antequera et al. (2020), Derigs et al. (2013), Erdem (2022), Gajpal et al. (2017), Ghiani et al. (2021), Gruler et al. (2017, 2020), Hauge et al. (2014), Hemmelmayr et al. (2013), Henke et al. (2015), Hu et al. (2018), Huang and Lin (2015), Kim et al. (2006, 2009), Kuo et al. (2012), Kytöjoki et al. (2007), Lan et al. (2022), Lavigne et al. (2021, 2022), Markov et al. (2016), Nowakowski (2017), Nuortio et al. (2006), Qiao et al. (2020), Ramos et al. (2014), Raucq et al. (2019), Taslimi et al. (2020), Wy and Kim (2013), Wy et al. (2013), Yazdani et al. (2021), Zhou et al. (2022)
IRP: Aksen et al. (2012, 2014), Bogh et al. (2014), Cárdenas-Barrón et al. (2019), Elbek and Wøhlk (2016), Markov et al. (2020), Mes et al. (2014), Montagné et al. (2019), Nolz et al. (2014a,b)
PDP: Wøhlk and Laporte (2022)
Other related work (Scope, Recent developments, Outlook, surveys, non-operations research papers, etc.): Abdallah et al. (2020), Ahmad et al. (2020), Akbarpour et al. (2021), Alarcon Ortega and Doerner (2023), Alarcon Ortega et al. (2020), Anagnostopoulos et al. (2015), Bel and Sebő (2021), Beliën et al. (2014), Carlos et al. (2019), Cubillos et al. (2022, 2021), Delgado-Antequera et al. (2021), Eisted et al. (2009), Elbek et al. (2015), Gansterer and Hartl (2018), Ghiani et al. (2014a), Ghiani and Laporte (2001), Ghiani et al. (2015), Giel and Dabrowska (2021), Hannan et al. (2018, 2020), Hoff et al. (2009), Hoogendoorn et al. (2022), Johansson (2006), Jorge et al. (2022), Ksiażek et al. (2021), Kumar et al. (2022), Liu and Liao (2021), Lopes and Ramos (2023), Lozano et al. (2018), Malladi and Sowlati (2018), Masmoudi et al. (2022), Miranda et al. (2015), Osaba et al. (2017, 2019), Ramos et al. (2018), Reed et al. (2014), Roy et al. (2022), Schiffer et al. (2019), Shao et al. (2020), Soysal et al. (2019), Van Engeland et al. (2020), Wu et al. (2020), Yang et al. (2022)

Literature by waste type and problem type

Table 1 Overview of literature by types of waste and types of problems

Types of waste/problem type	LRP	GRP	ARP
Household, solid, residential, municipal	Blazquez and Paredes-Belmar (2020), Ghiani et al. (2014b), Gläser and Stücken (2021), Hrabec et al. (2020), Inghels et al. (2016), Ma et al. (2021)	Bach et al. (2016)	Amponsah and Salhi (2004), Babaee Tirkolaee et al. (2022, 2019, 2018), Cortinhal et al. (2016), Ghiani et al. (2005), Gläser (2022), Jin et al. (2021), Kiilerich and Wøhlk (2018)† Rodrigues and Soeiro Ferreira (2015), Willemse and Joubert (2016), Wøhlk and Laporte (2018)
Recycling (general)	Cubillos and Wøhlk (2021), Vidović et al. (2016), paper, cardboard: Hemmelmayr et al. 2017		Del Pia and Filippi (2006), Zbib and Laporte (2020)†, Zbib and Wøhlk (2019)†
Construction, commercial, non-hazardous industrial			
Biodegradable, food	Lavigne et al. (2021)		
Vegetable oil			
Hazardous	industrial: Alumur and Kara (2007), Rabbani et al. (2019, 2020), Samanlioglu (2013), Yu et al. (2020)		
Medical	Govindan et al. (2022)		
Electric		Pourhejazy et al. (2021)	
Multiple types	Hemmelmayr et al. (2014)		Wøhlk and Laporte (2019)
Not specified			Moazzeni et al. (2022), Wøhlk and Laporte (2017)

References marked with † consider multi-compartment vehicles.

Table 2 Overview of literature by types of waste and types of problems

Types of waste/problem type	VRP	IRP	PDP
Household, solid, residential, municipal	Aliahmadi et al. (2021), Delgado-Antequera et al. (2020), Gajpal et al. (2017)†, Ghiani et al. (2021), Huang and Lin (2015), Kuo et al. (2012), Nuortio et al. (2006), Qiao et al. (2020)	Mes et al. (2014)	
Recycling (general)	Cao et al. (2021), Hemmelmayr et al. (2013), plastic: Bing et al. (2014), glass, paper, plastic/metal: De Morais et al. (2022), Ramos et al. (2014), bulky: Aringhieri et al. (2018), glass: De Bruecker et al. (2018)†, Henke et al. (2015)†	Markov et al. (2020), glass and paper: Bogh et al. 2014, Elbek and Wøhlk 2016	Wøhlk and Laporte (2022)⋆
Construction, commercial, non-hazardous industrial	Kim et al. (2006), Raucq et al. (2019)⋆, Yazdani et al. (2021), bulky: Hauge et al. (2014)⋆		
Biodegradable, food			
Vegetable oil		Aksen et al. (2012, 2014), Cárdenas-Barrón et al. (2019), Montagné et al. (2019)	
Hazardous	biological (animal waste): Coene et al. (2010)		
Medical	Taslimi et al. (2020)	Nolz et al. (2014a,b)	
Electric	Kim et al. (2009), Nowakowski (2017)		
Multiple types	bio and residual: Lavigne et al. (2022), dry and wet: Zhou et al. (2022), recyclables and used cooking oil: Erdem (2022)†		
Not specified	Battarra et al. (2014), Benjamin and Beasley (2010, 2013), Gruler et al. (2017, 2020), Kytöjoki et al. (2007), Lan et al. (2022)		

References marked with ⋆ denote a special case of a single-compartment vehicle, namely a Roll-on/roll-off vehicle.
References marked with † consider multi-compartment vehicles.

Solution methods by problem type

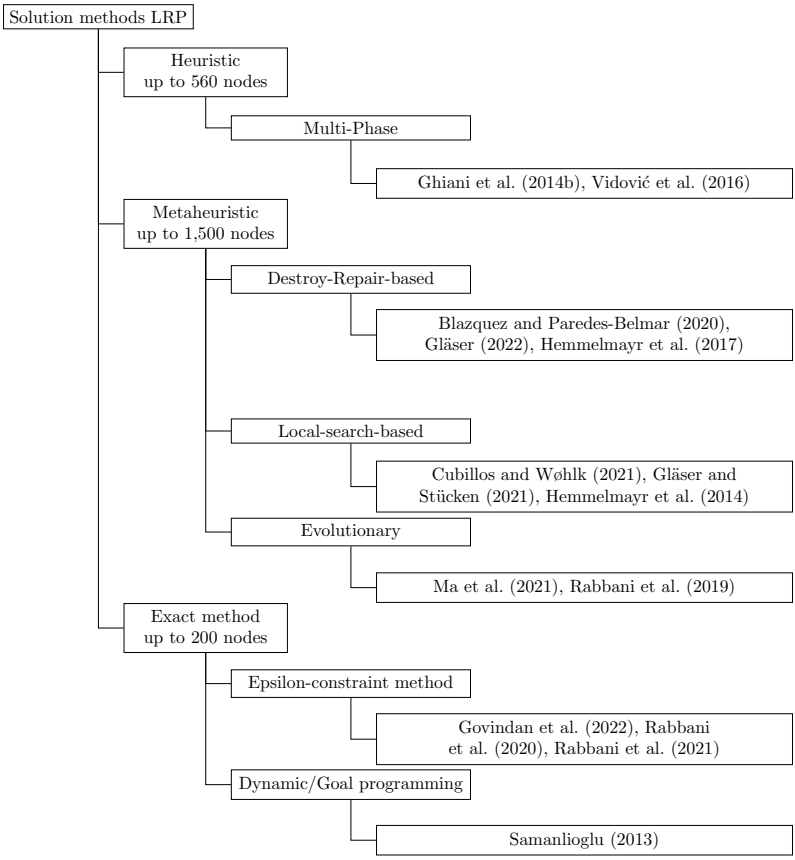

Figure 1 Solution methods used in LRPs

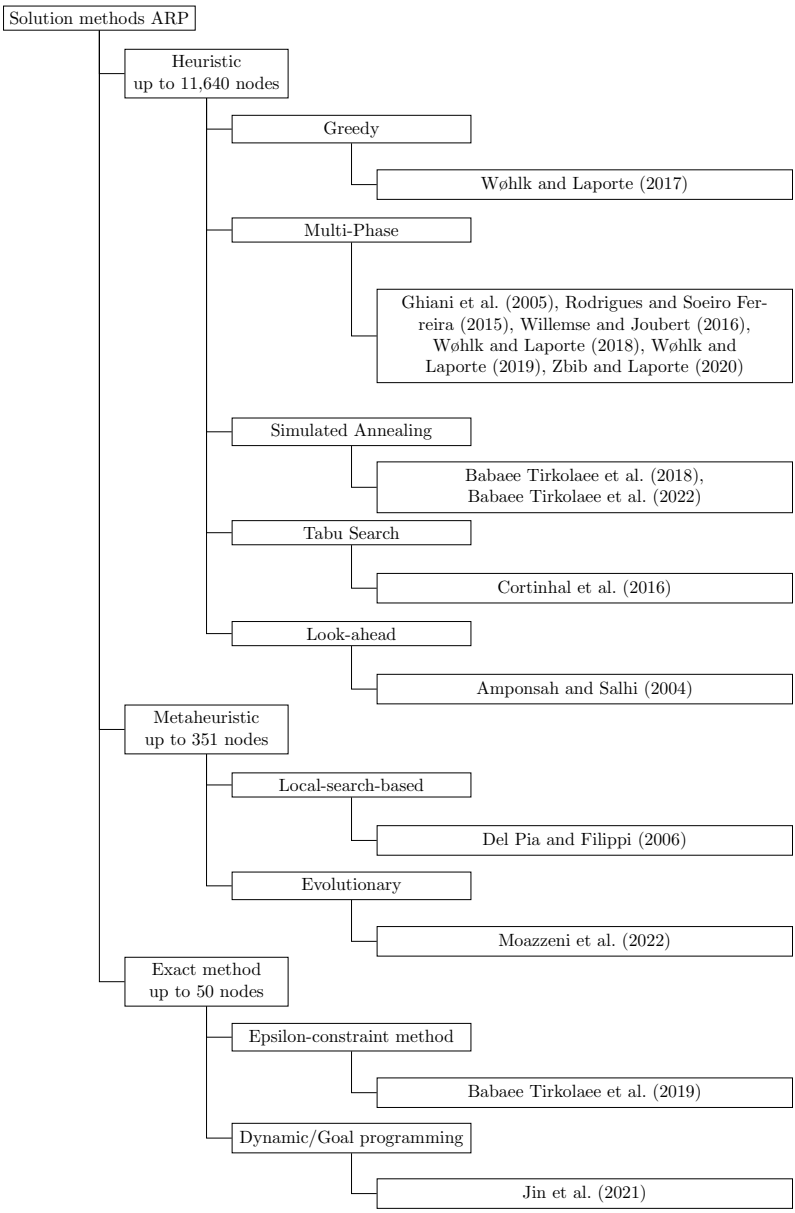

Figure 2 Solution methods used in ARPs

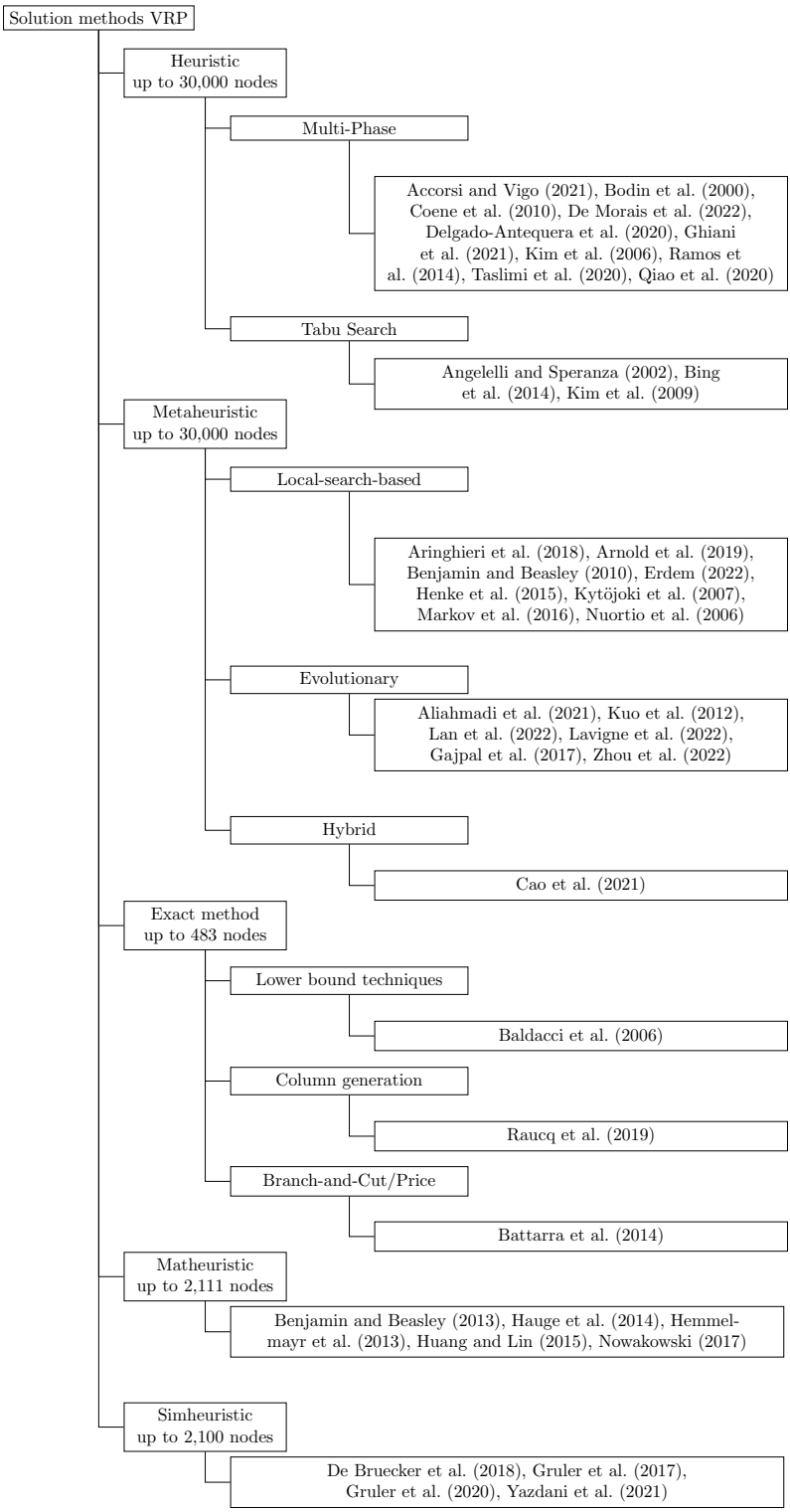

Figure 3 Solution methods used in VRPs

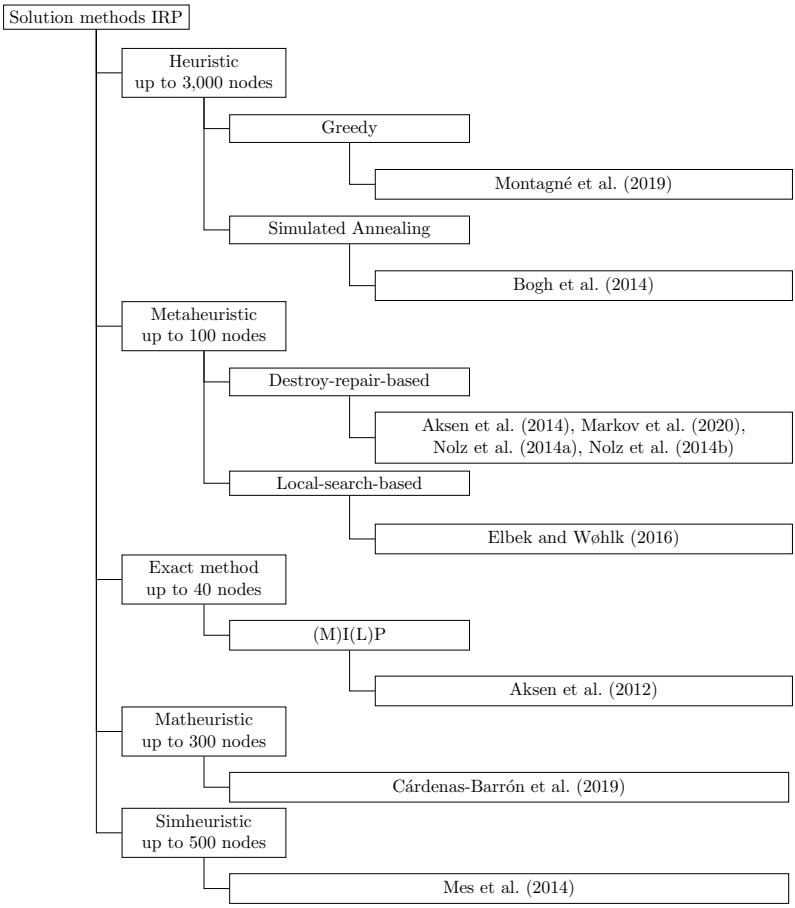

Figure 4 Solution methods used in IRPs

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