Vineopt and friends

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Software made by Kaj Holmberg

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Vineopt: Visual network optimization

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Vineopt: Visual network optimization (Tcl/Tk, C, C++, fortran)

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Tcl/Tk good for graphics etc, bad for computations.

Python better, many extensions, Tkinter for graphics.

C good for fast computations, as is fortran.

Dine

Dine

Small starting program:

Dine

Small starting program:

dine

Dine

Small starting program:

dine (C)

Dine

Small starting program:

dine (C)

Checks where it is run, especially if student.

Dine

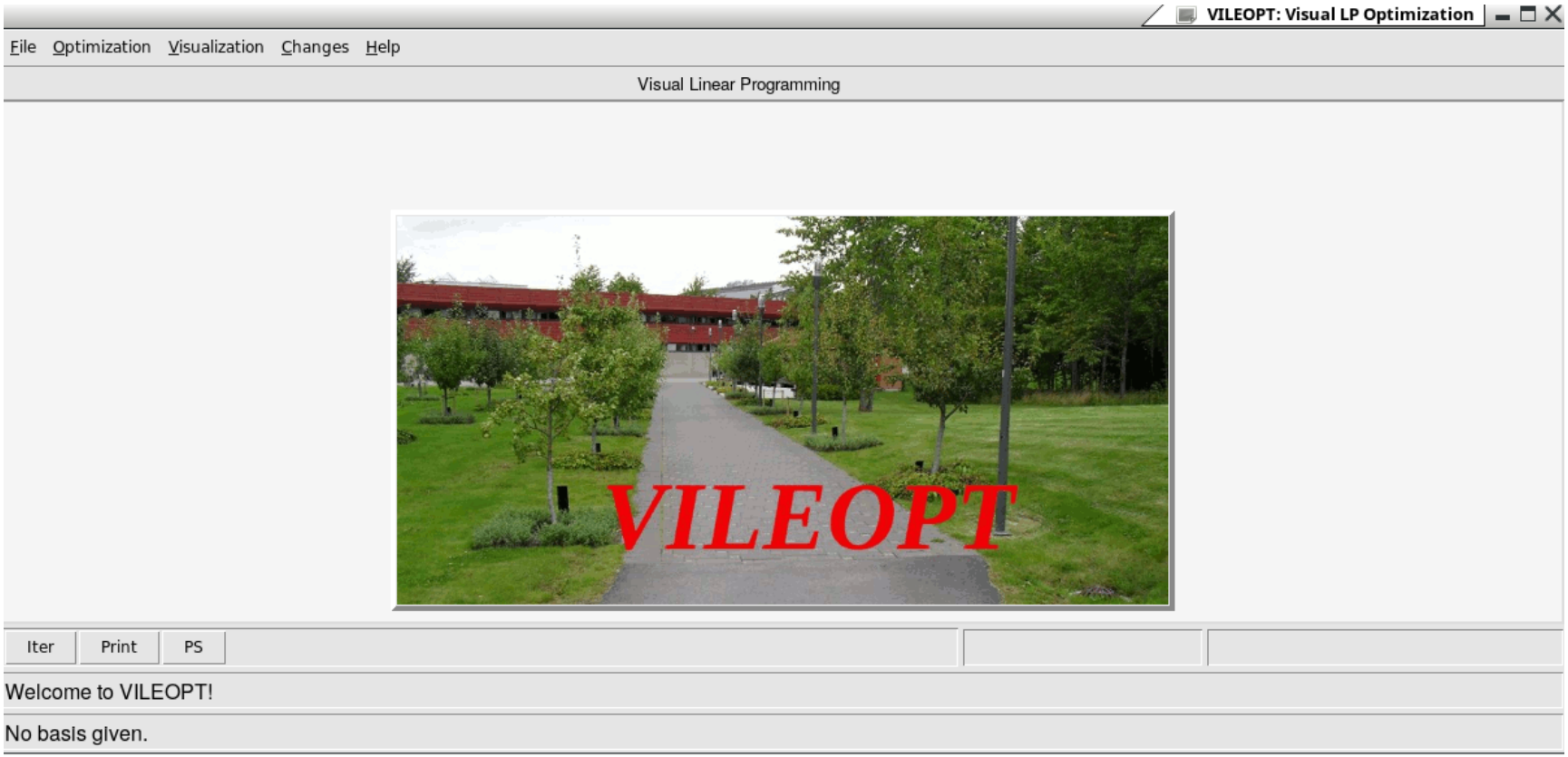
Small starting program:

dine (C)

Checks where it is run, especially if student.

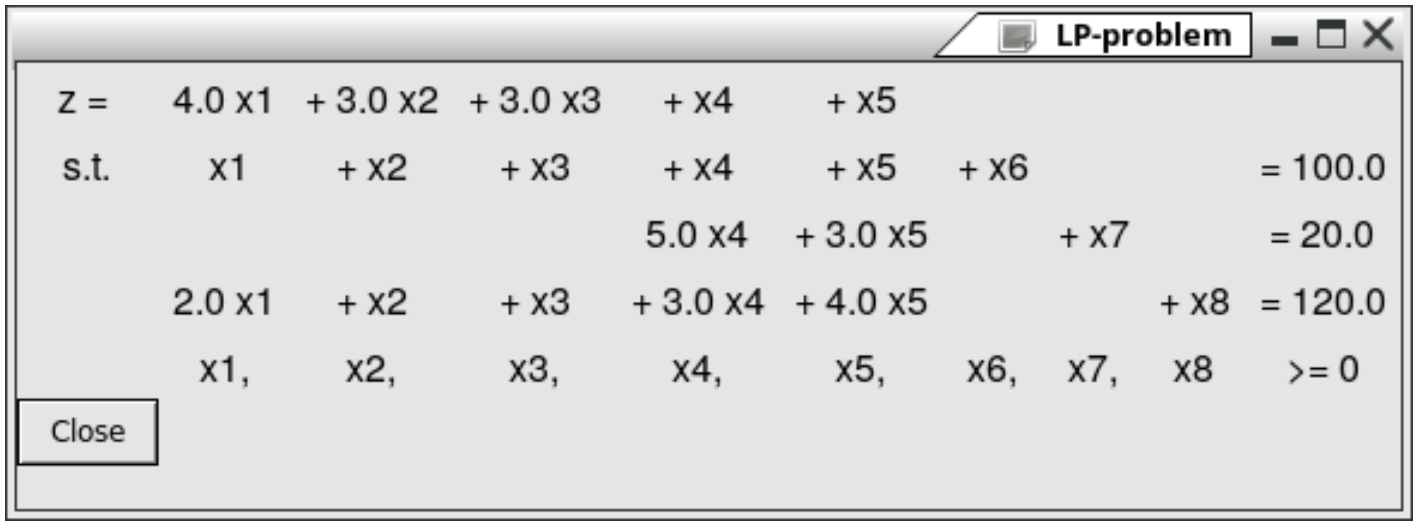
```
[kaj@hohome vineopt]$ ./dine
 +++++ Dine at Kaj's: Running opt labs (Vineopt, Vileopt, Nileopt) +++++
Tue May 30 11:08:13 2017
 What to run?
  k=0: Quit
  k=1: Run Vineopt
  k=2: Run Vileopt
  k=3: Run Nileopt
  k=4: Run Vineopt without maps
  k=5: Run Vineopt for ORSS
  k=6: Run Snowplan
  k=7: Run Nileopt with more functions
  k=8: Clean all
     +100: Do not remove temporary files at exit
 (Many temporary files are created, so you are advised to run dine in a separate directory.)
 Give number!
```

Vileopt starting

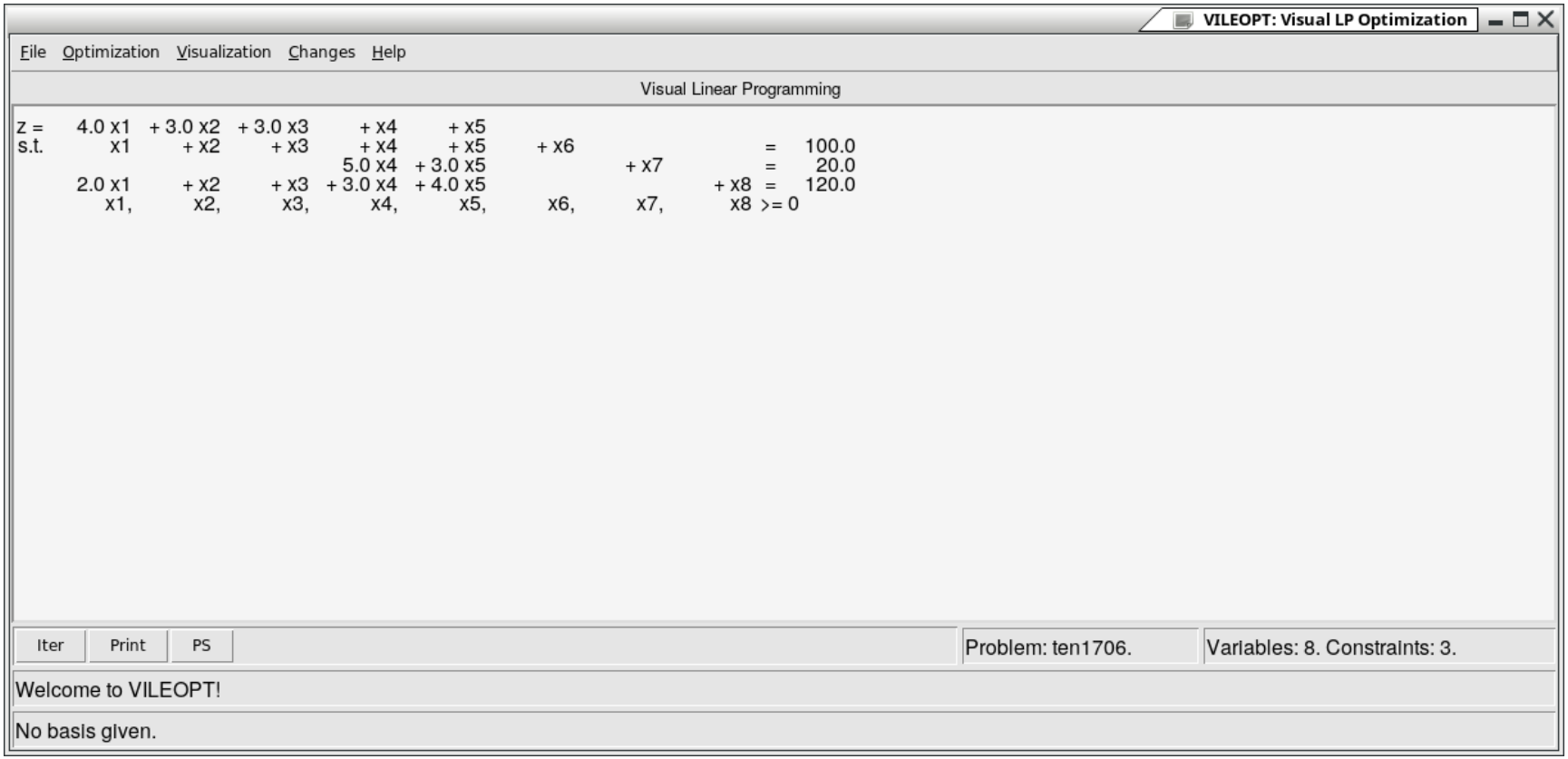


Purpose: Manually controlled pivots in the simplex method.
Create, save, read, change problem.

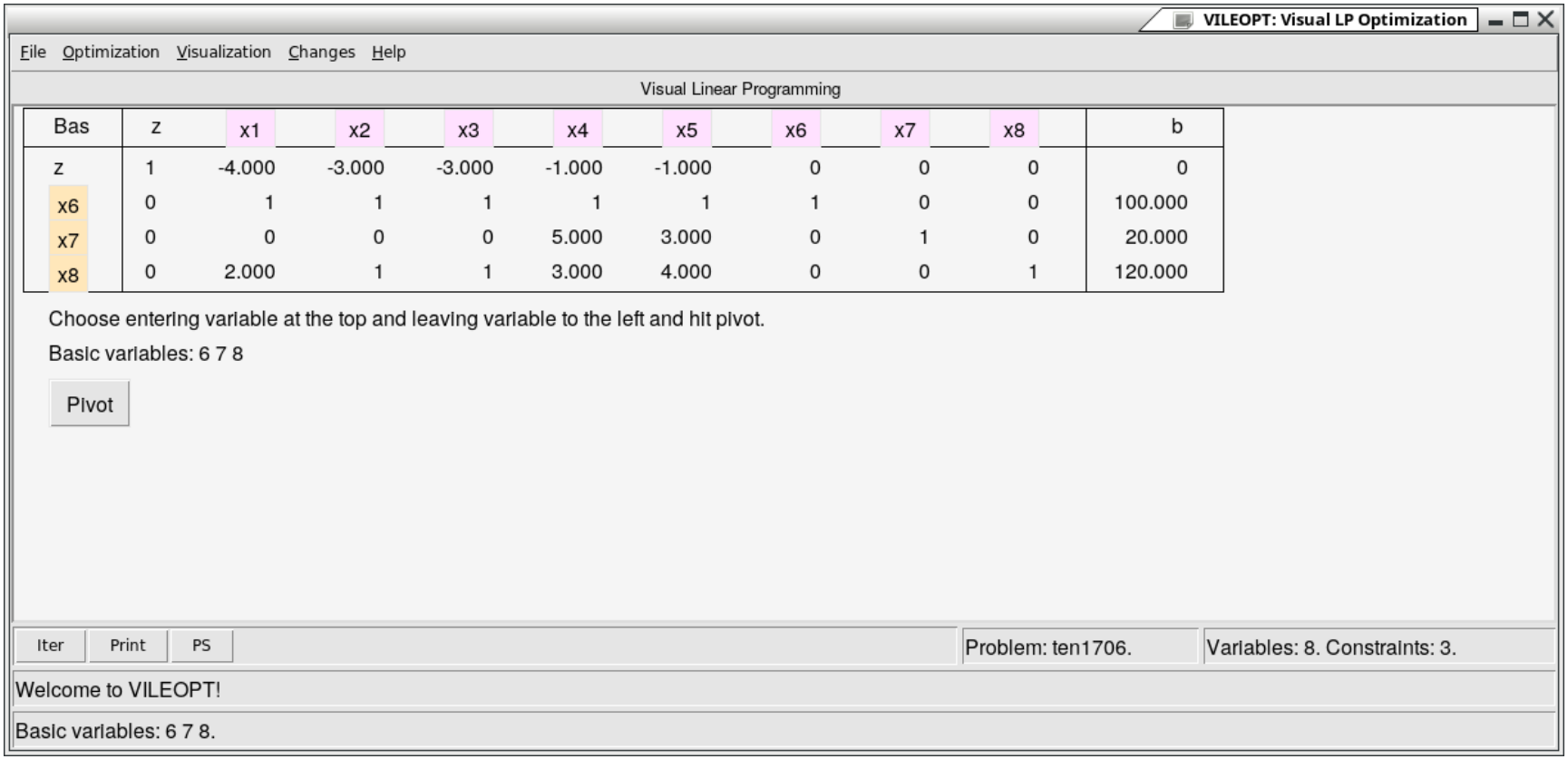
Vileopt problem



Vileopt tableau

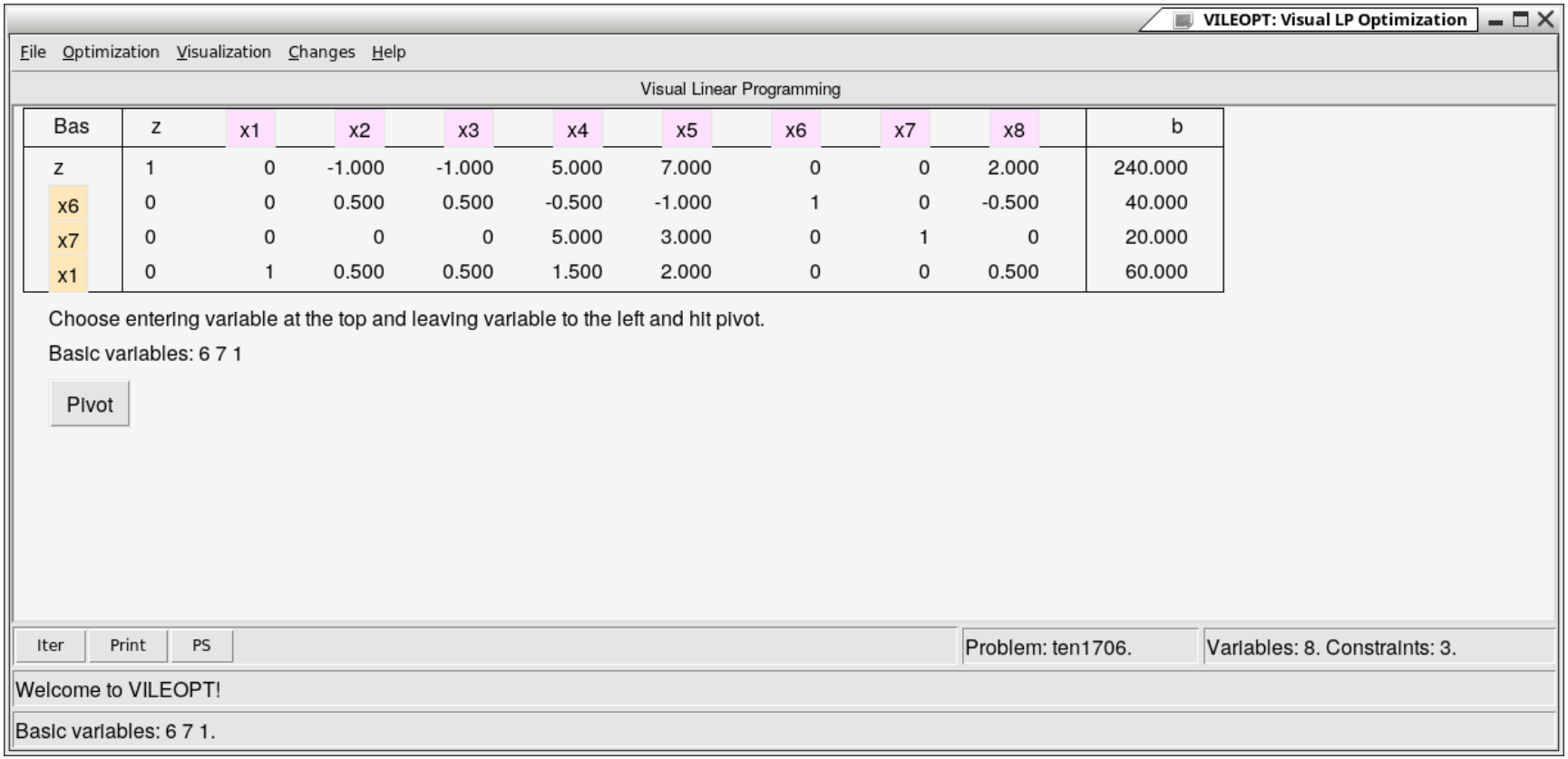


Vileopt pivot

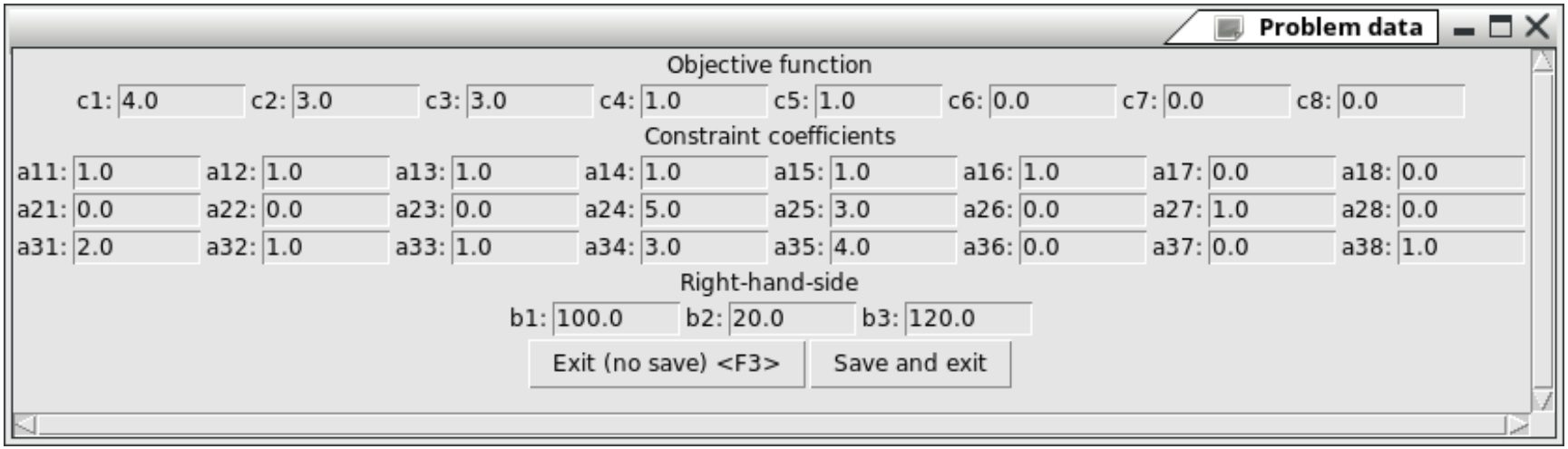


Bas	z	x1	x2	x3	x4	x5	x6	x7	x8	b
z	1	-4.000	-3.000	-3.000	-1.000	-1.000	0	0	0	0
x6	0	1	1	1	1	1	1	0	0	100.000
x7	0	0	0	0	5.000	3.000	0	1	0	20.000
x8	0	2.000	1	1	3.000	4.000	0	0	1	120.000

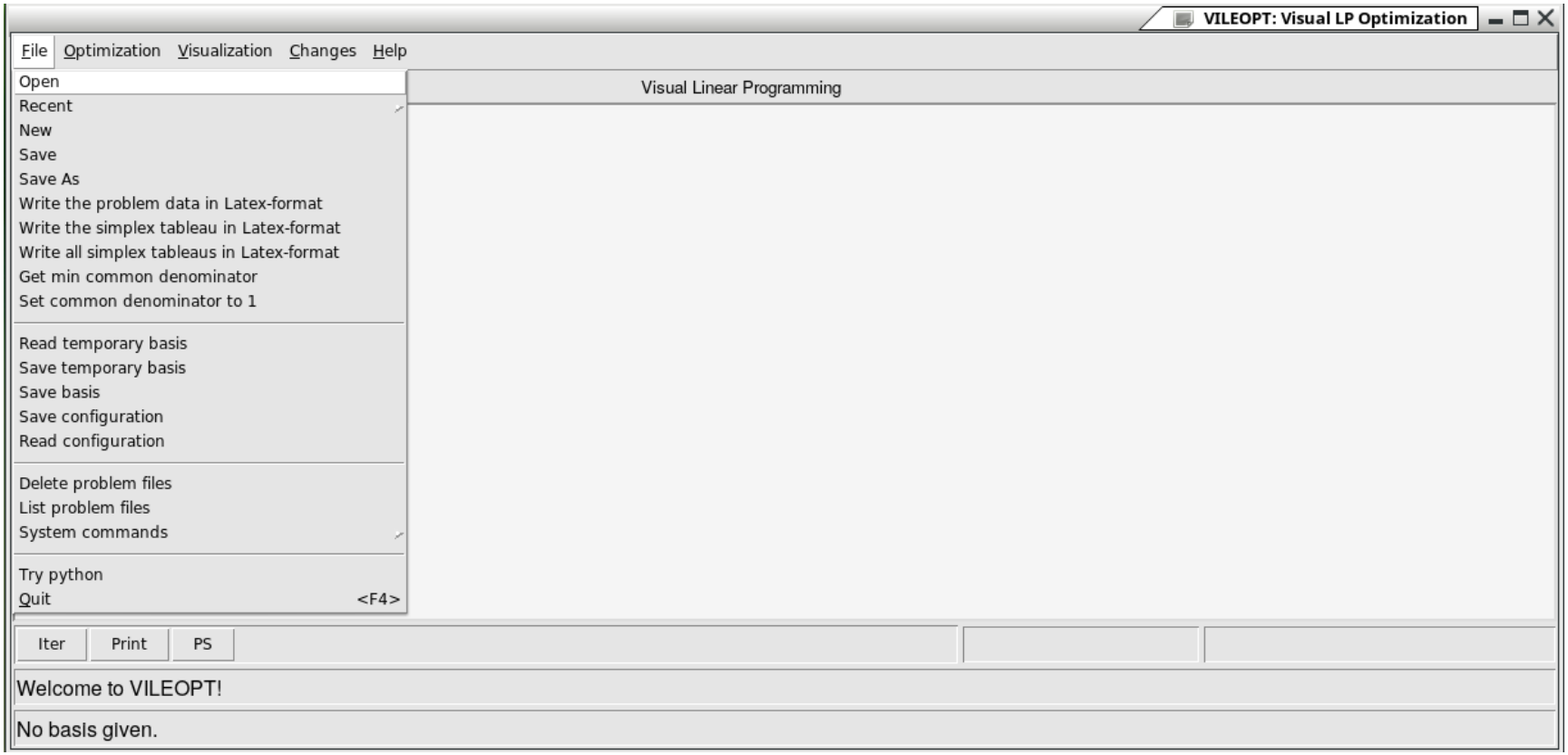
Vileopt iteration 2



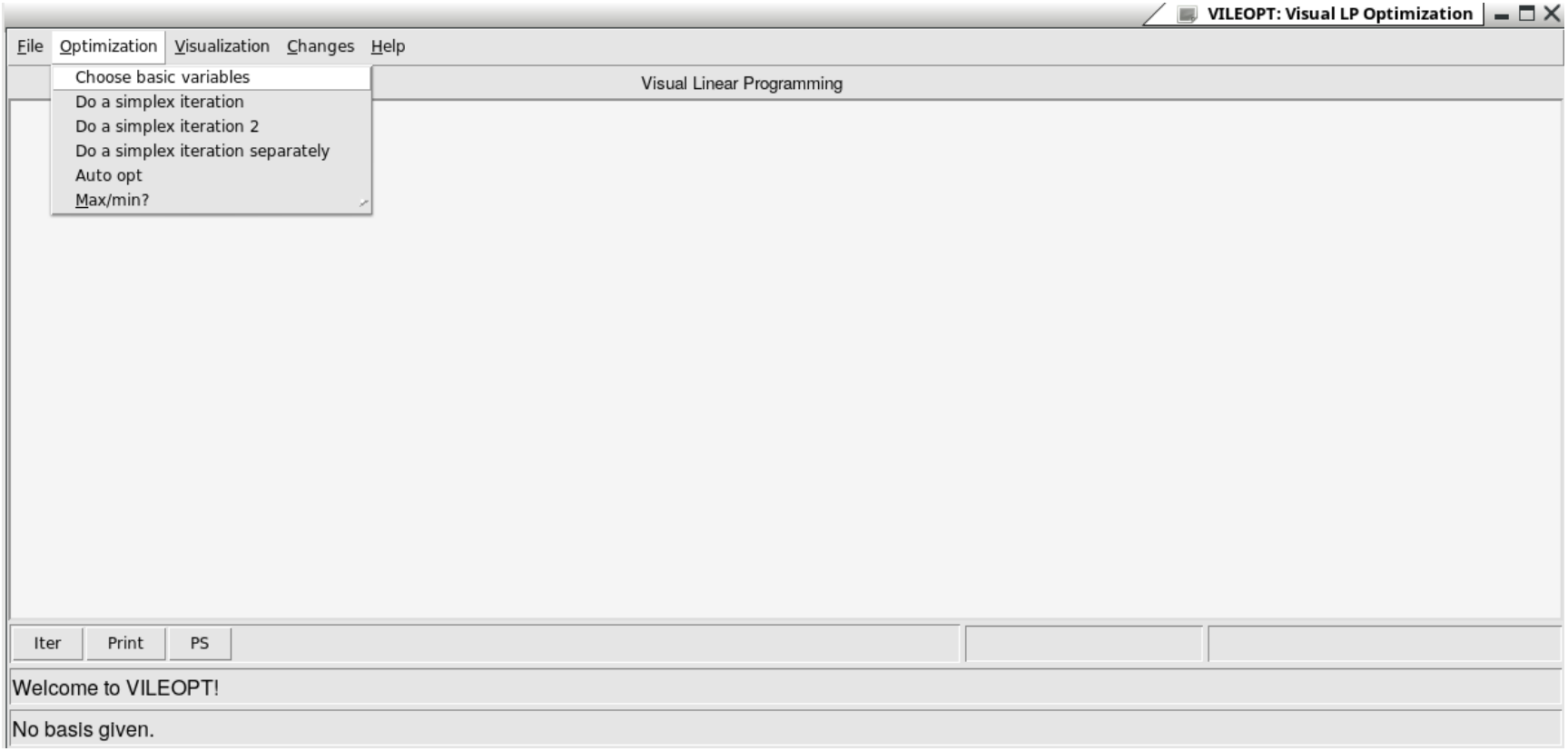
Vileopt tabular change



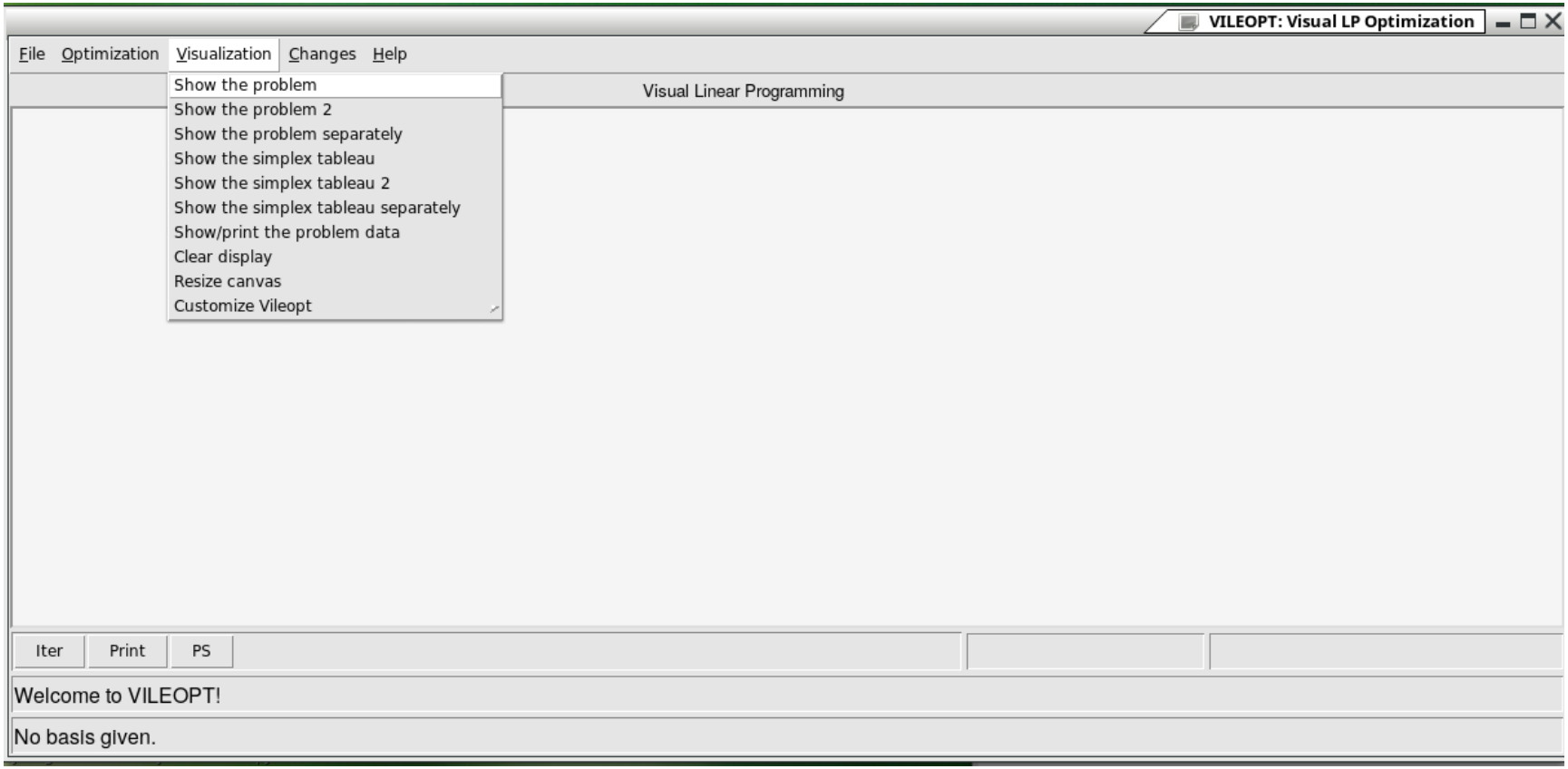
Vileopt menu 1



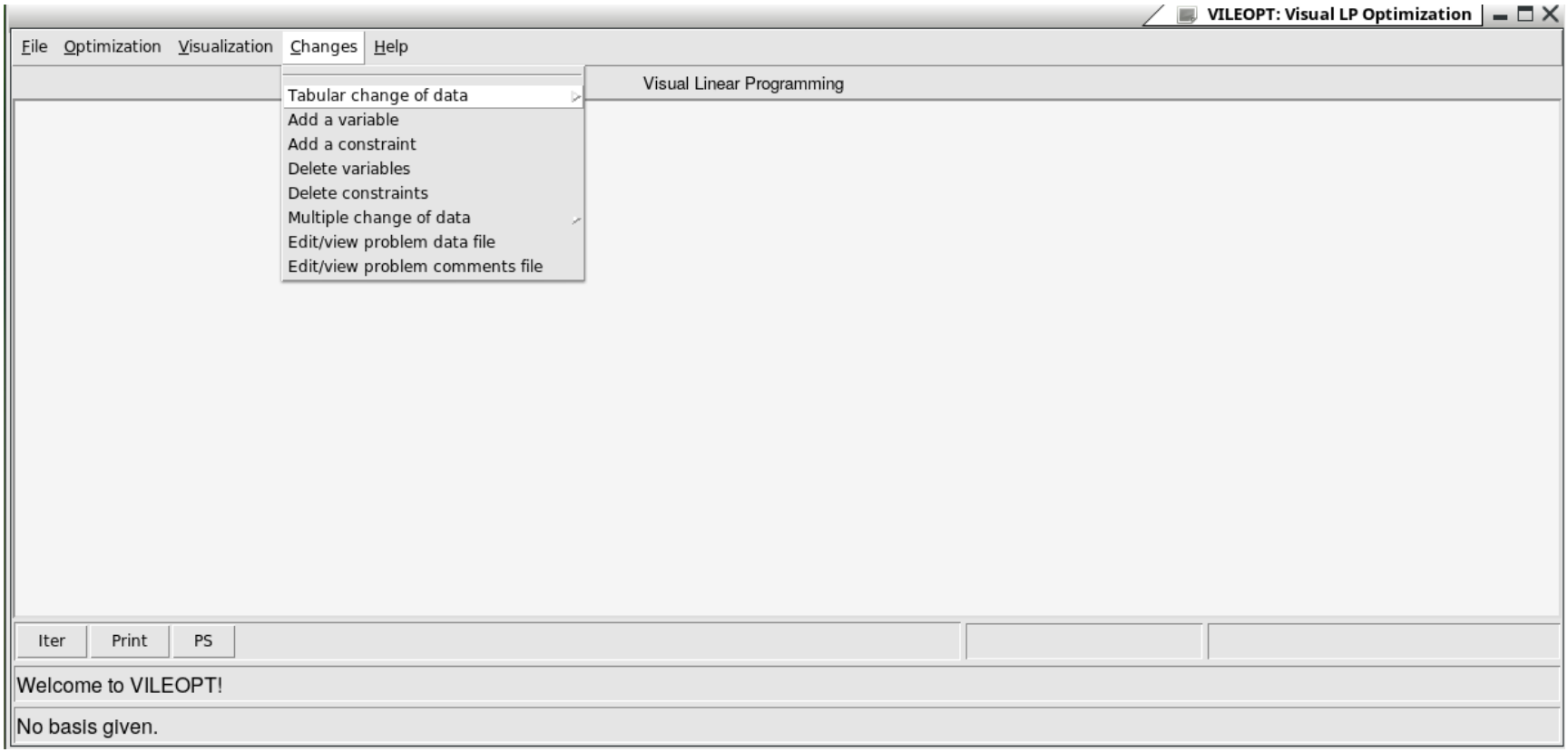
Vileopt menu 2



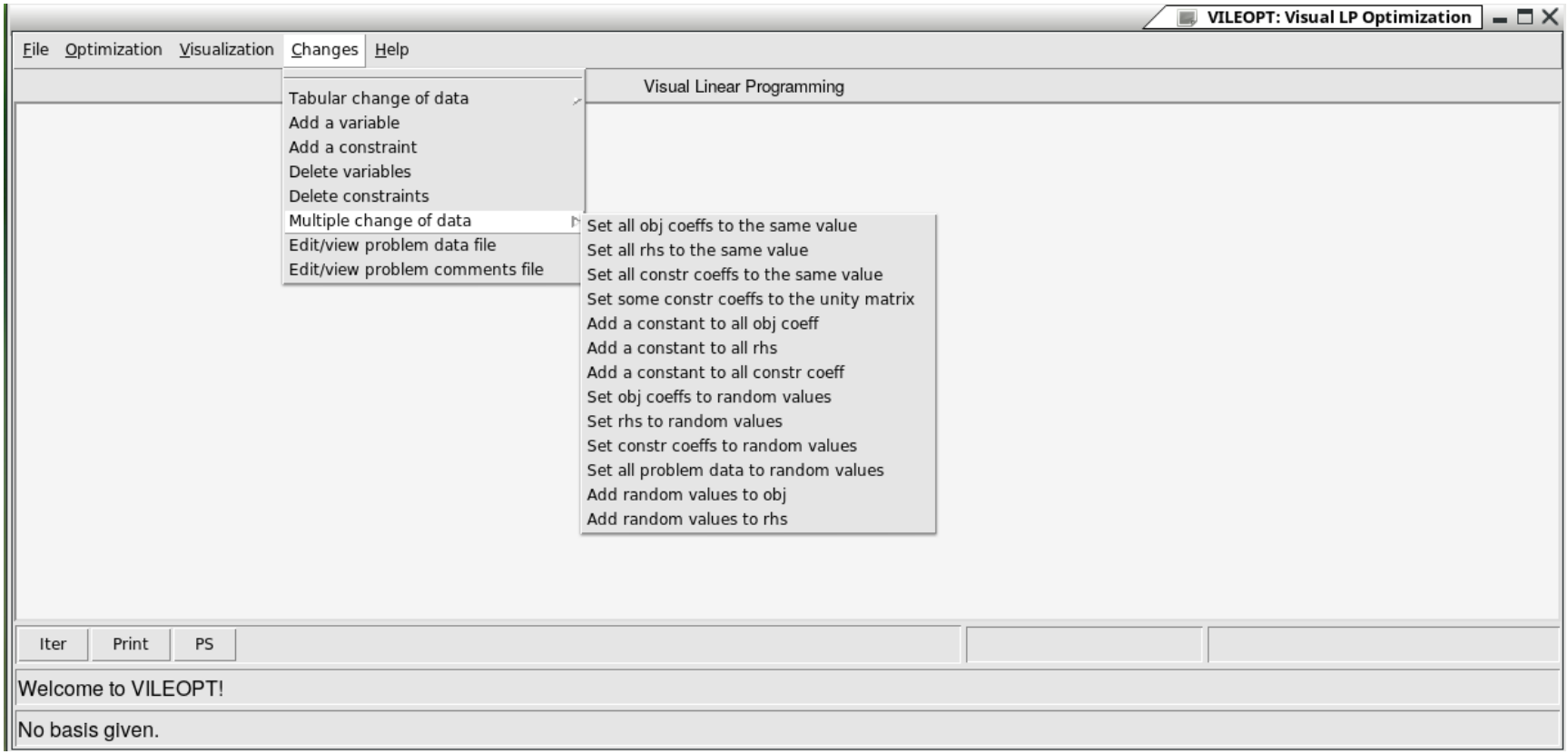
Vileopt menu 3



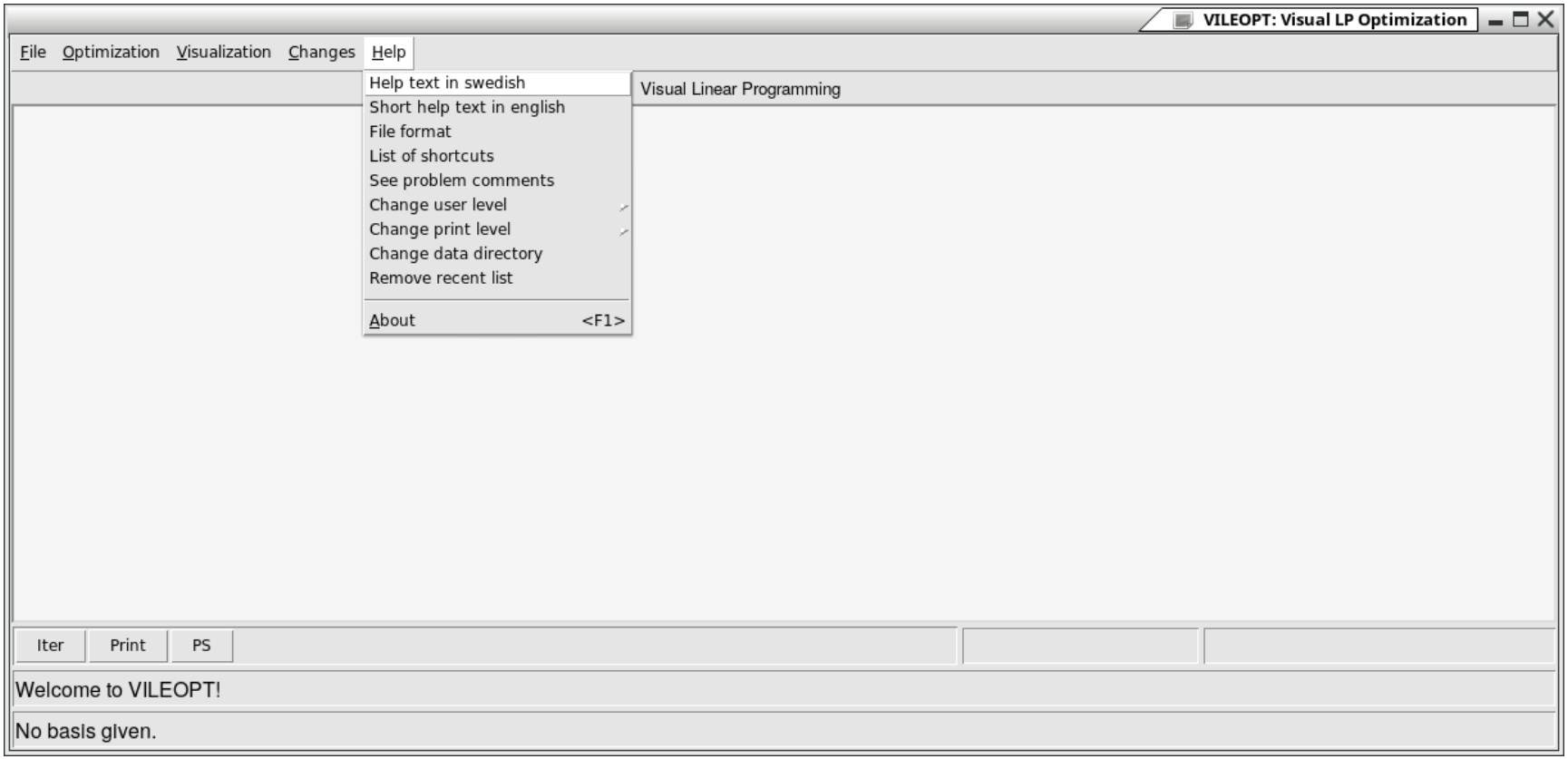
Vileopt menu 4



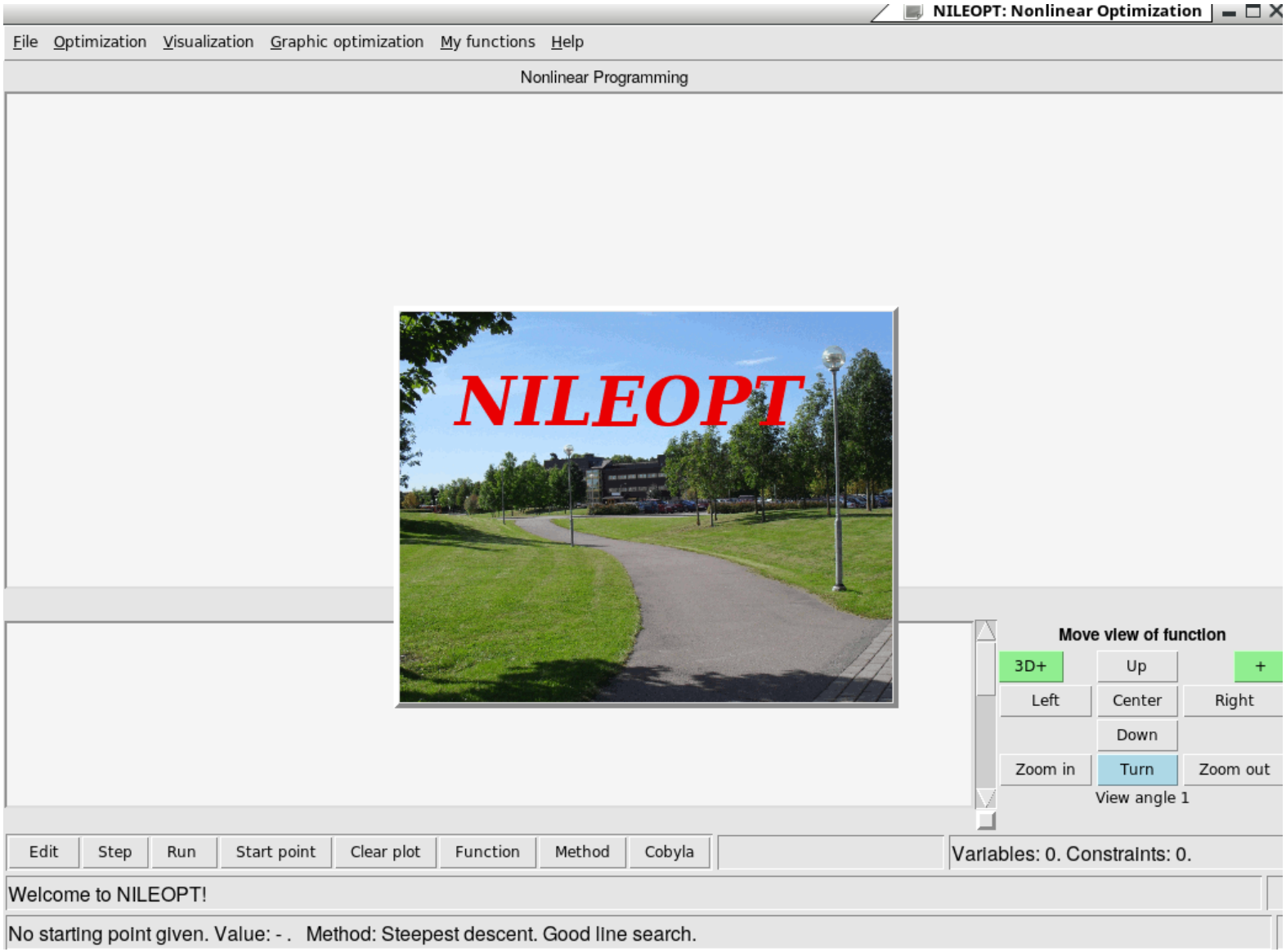
Vileopt menu 4b



Vileopt menu 5



Nileopt starting



Nileopt purpose

Illustrate solution of nonlinear optimization problems.

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Create, read save, change problems.

Nileopt purpose

Illustrate solution of nonlinear optimization problems.

Create, read save, change problems. Simplified AMPL-syntax.

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Create, read save, change problems. Simplified AMPL-syntax.

Solve constrained problem (with Cobyla/Scipy).

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Step through solution of unconstrained problems

Nileopt purpose

Illustrate solution of nonlinear optimization problems.

Create, read save, change problems. Simplified AMPL-syntax.
Solve constrained problem (with Cobyla/Scipy).
Step through solution of unconstrained problems
with many methods

Nileopt purpose

Illustrate solution of nonlinear optimization problems.

Create, read save, change problems. Simplified AMPL-syntax.

Solve constrained problem (with Cobyla/Scipy).

Step through solution of unconstrained problems

with many methods (steepest descent, Newton, several quasi-Newton, several conjugate gradient).

Nileopt purpose

Illustrate solution of nonlinear optimization problems.

Create, read save, change problems. Simplified AMPL-syntax.

Solve constrained problem (with Cobyla/Scipy).

Step through solution of unconstrained problems

with many methods (steepest descent, Newton, several quasi-Newton, several conjugate gradient).

Compare the methods visually.

Nileopt purpose

Illustrate solution of nonlinear optimization problems.

Create, read save, change problems. Simplified AMPL-syntax.

Solve constrained problem (with Cobyla/Scipy).

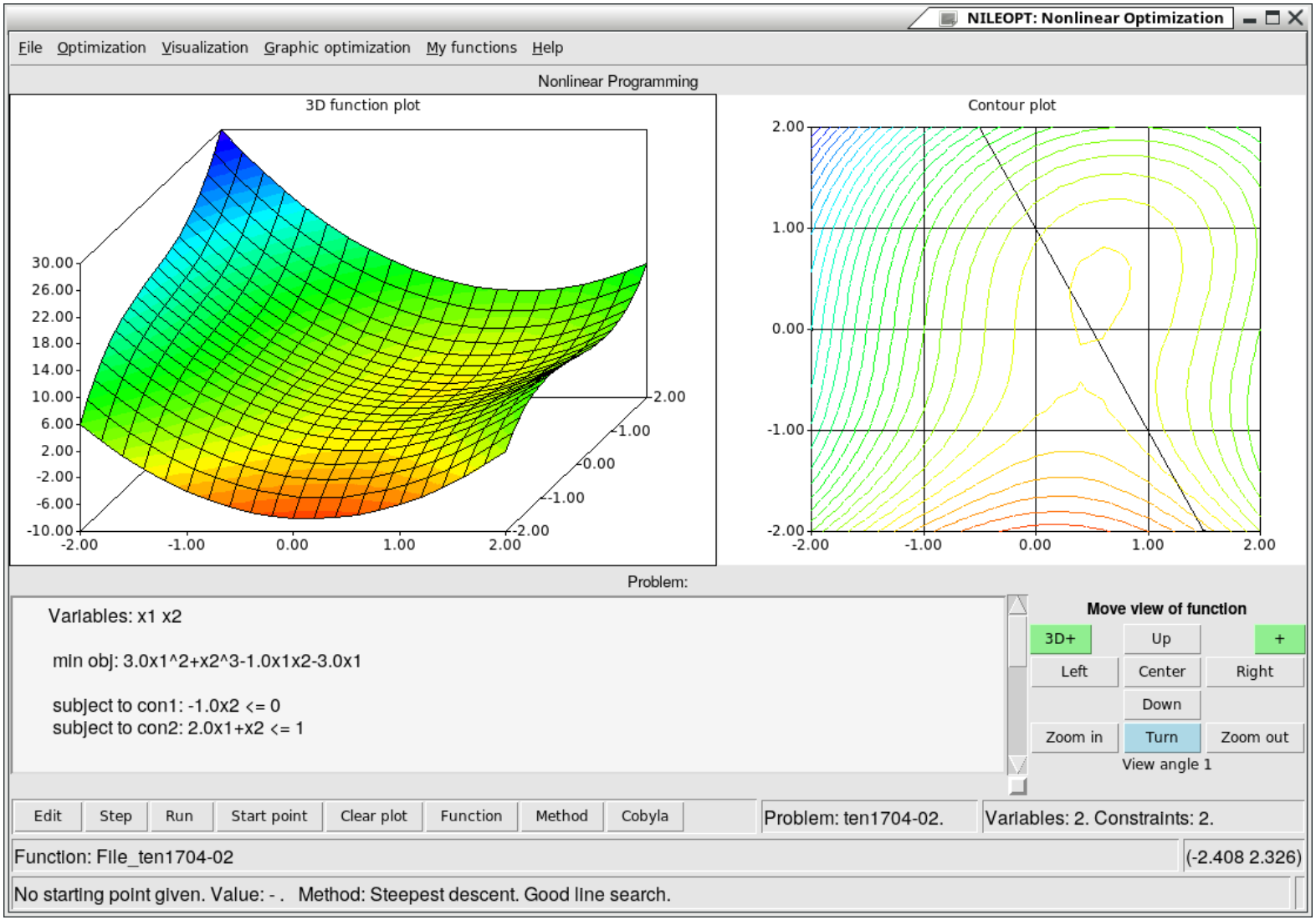
Step through solution of unconstrained problems

with many methods (steepest descent, Newton, several quasi-Newton, several conjugate gradient).

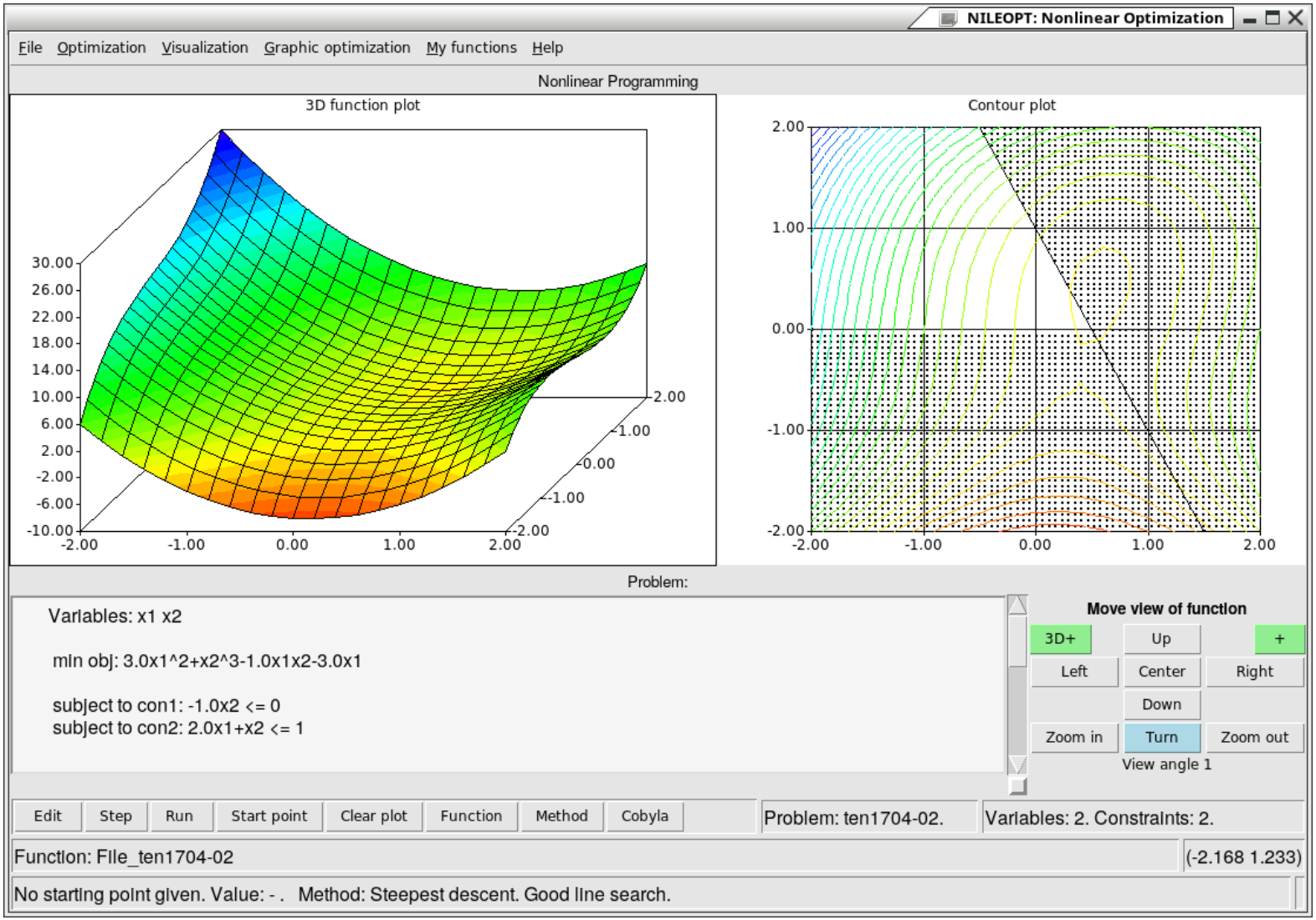
Compare the methods visually.

Show contours and 3D-image.

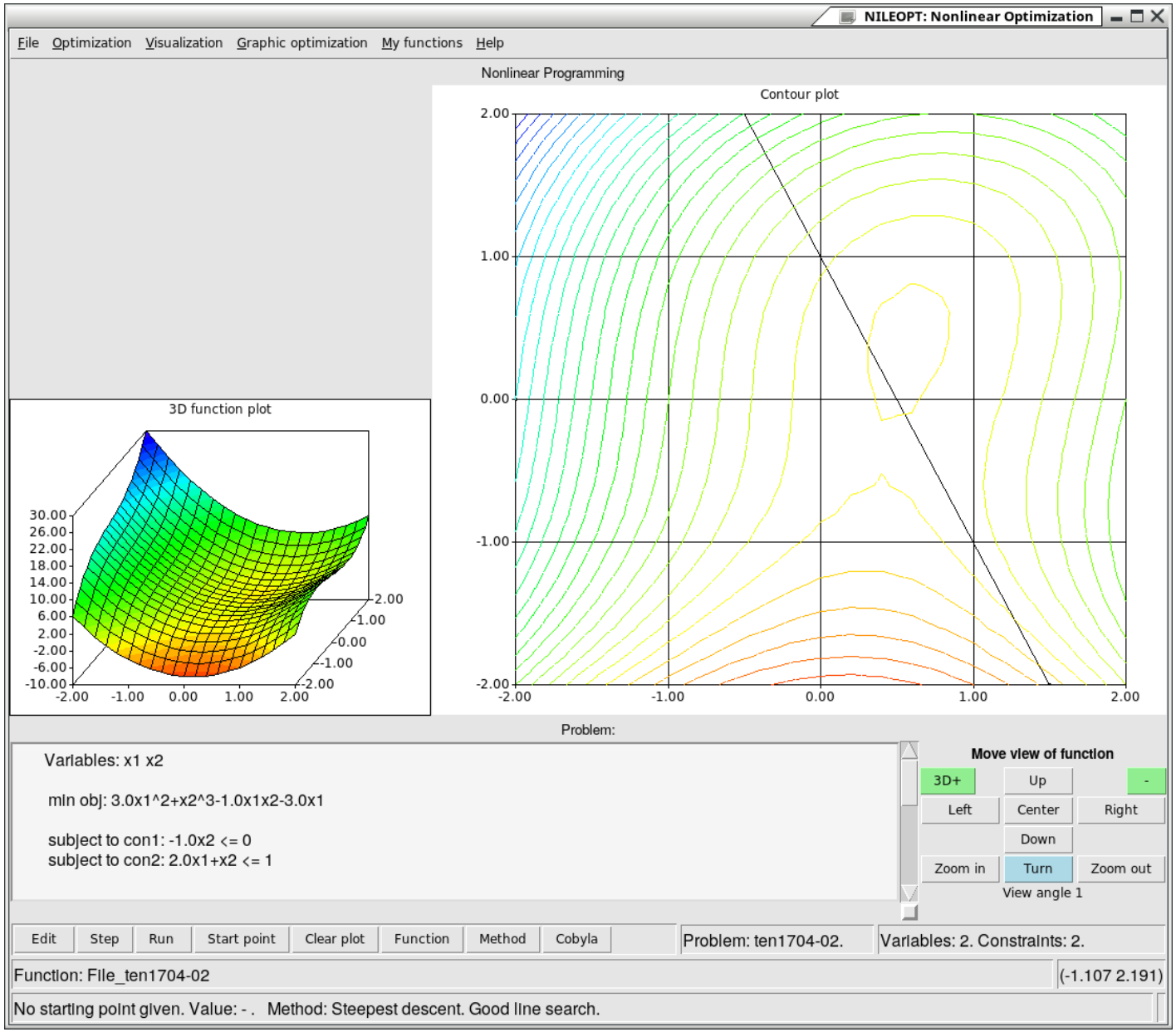
Nileopt


NILEOPT: Nonlinear Optimization
File Optimization Visualization Graphic optimization My functions Help
Nonlinear Programming
3D function plot
30.00
26.00
22.00
18.00
14.00
10.00
6.00
2.00
-2.00
-6.00
-10.00
-2.00 -1.00 0.00 1.00 2.00
2.00 1.00 0.00 -1.00 -2.00
Contour plot
2.00
1.00
0.00
-1.00
-2.00
-2.00 -1.00 0.00 1.00 2.00
Problem:
Variables: x1 x2
min obj: 3.0x1^2+x2^3-1.0x1x2-3.0x1
subject to con1: -1.0x2 <= 0
subject to con2: 2.0x1+x2 <= 1
Move view of function
3D+ Up +
Left Center Right
Down
Zoom in Turn Zoom out
View angle 1
Edit Step Run Start point Clear plot Function Method Cobyla
Problem: ten1704-02.
Variables: 2. Constraints: 2.
Function: File_ten1704-02
(-2.408 2.326)
No starting point given. Value: - . Method: Steepest descent. Good line search.

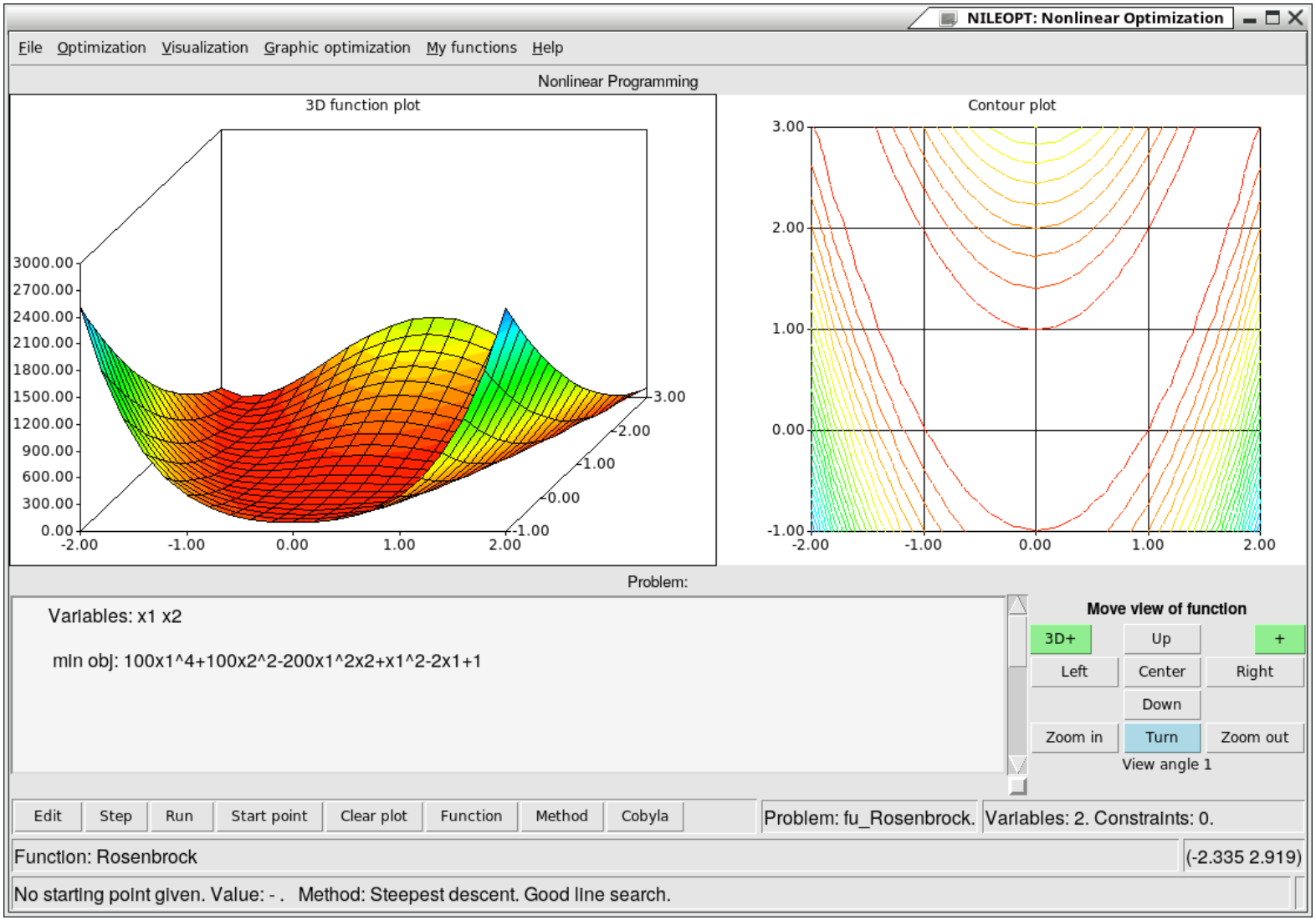
Nileopt feasible set



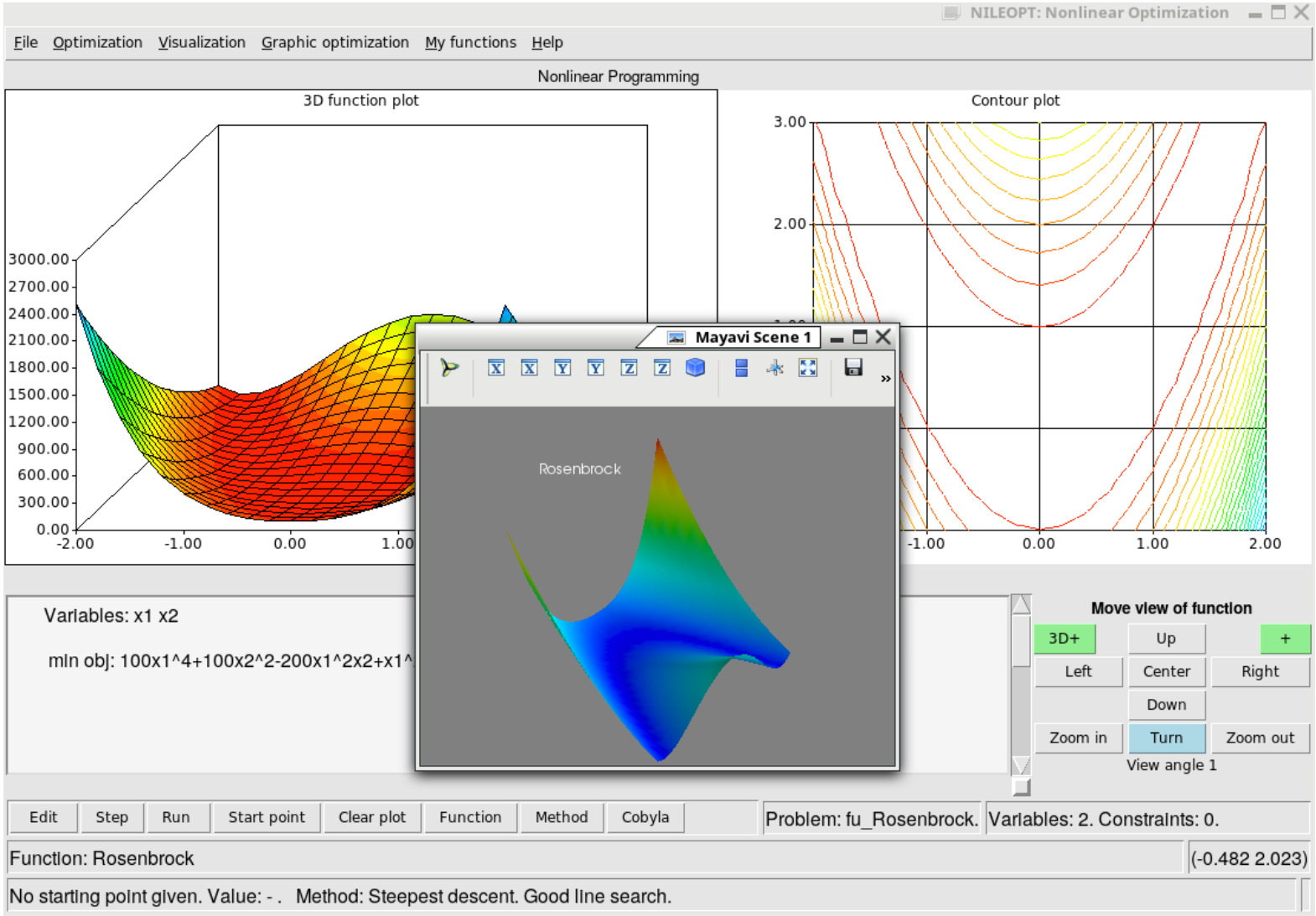
Nileopt layout 2



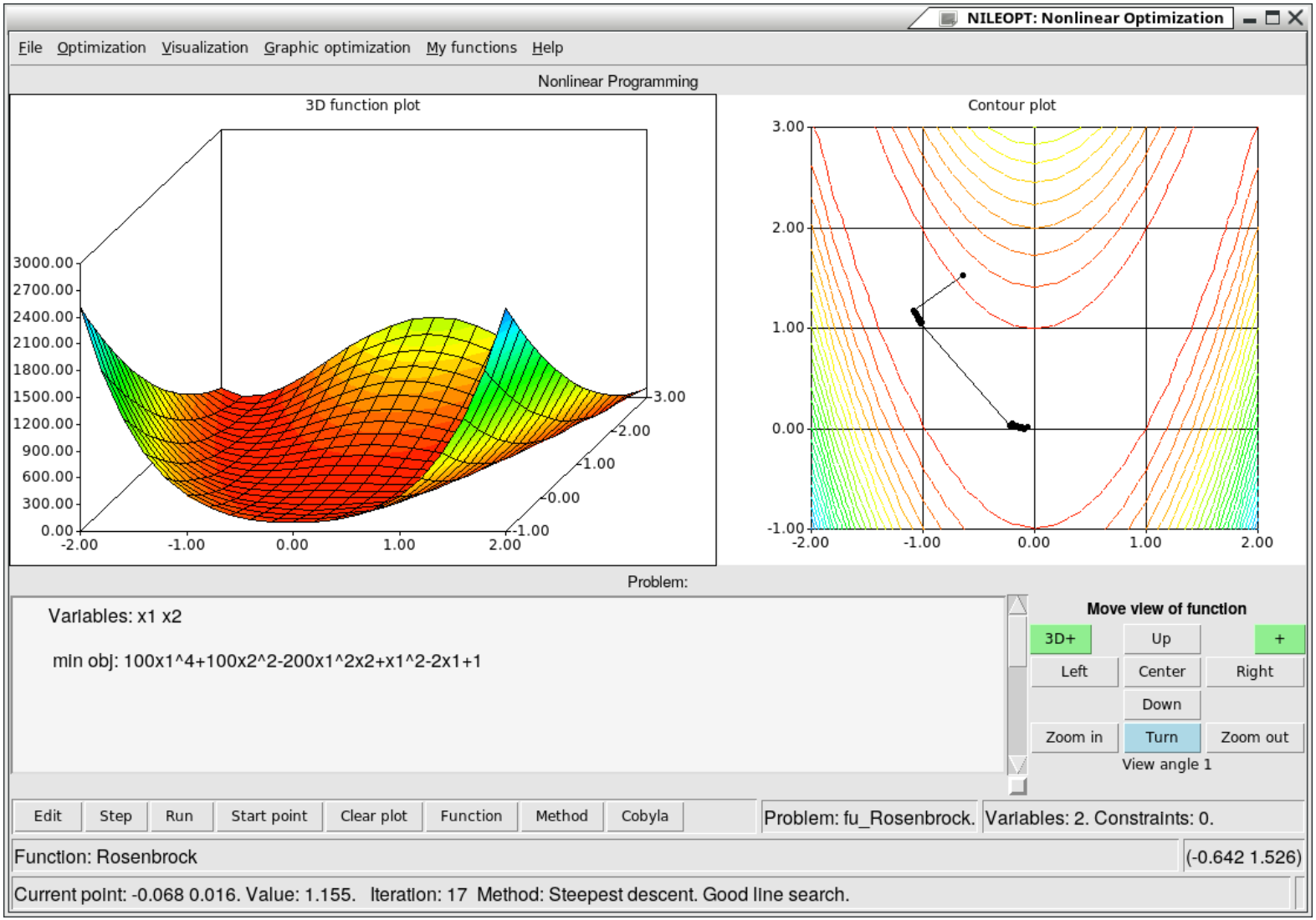
Nileopt: Rosenbrock



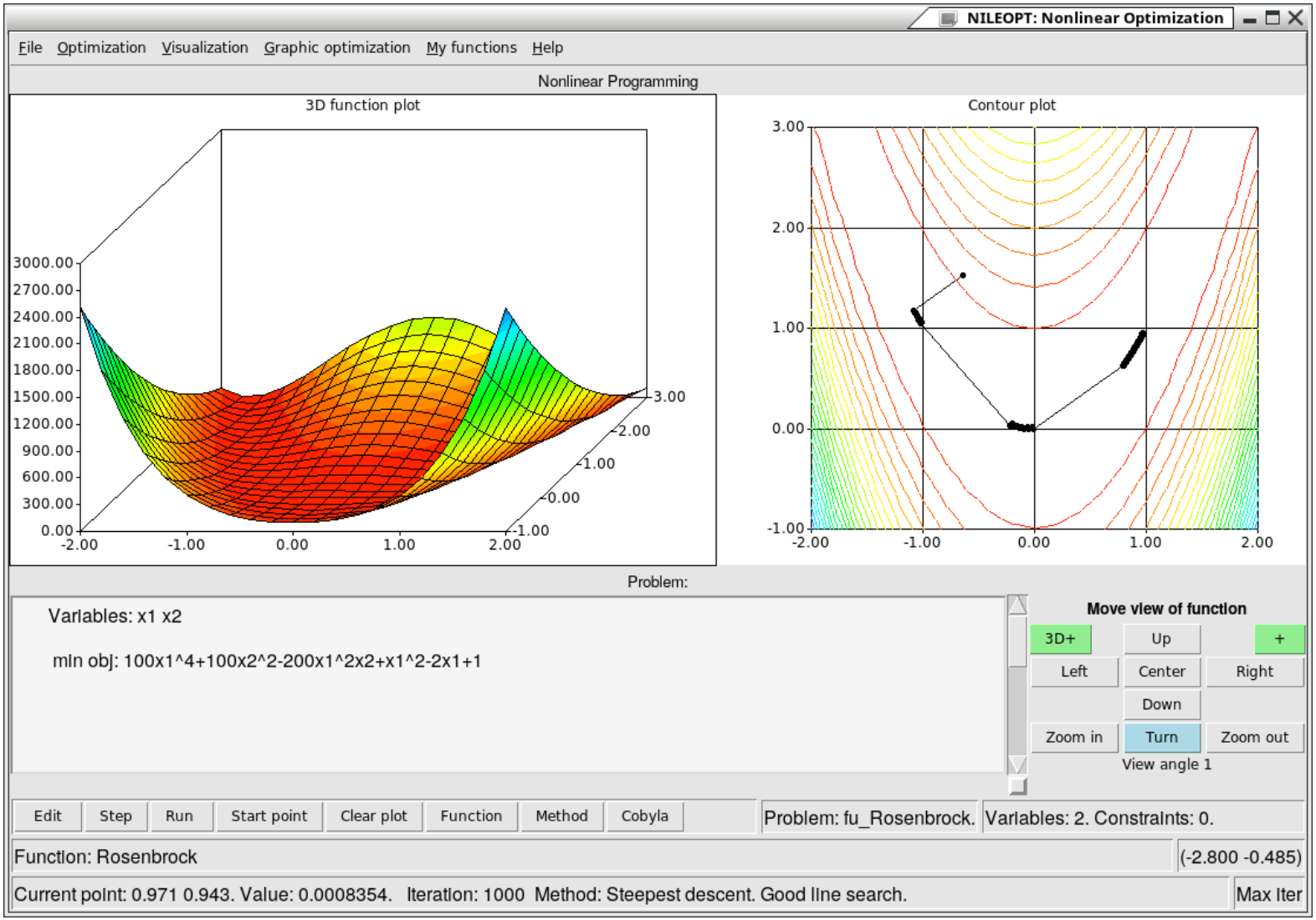
Nileopt: Rosenbrock - 3D view



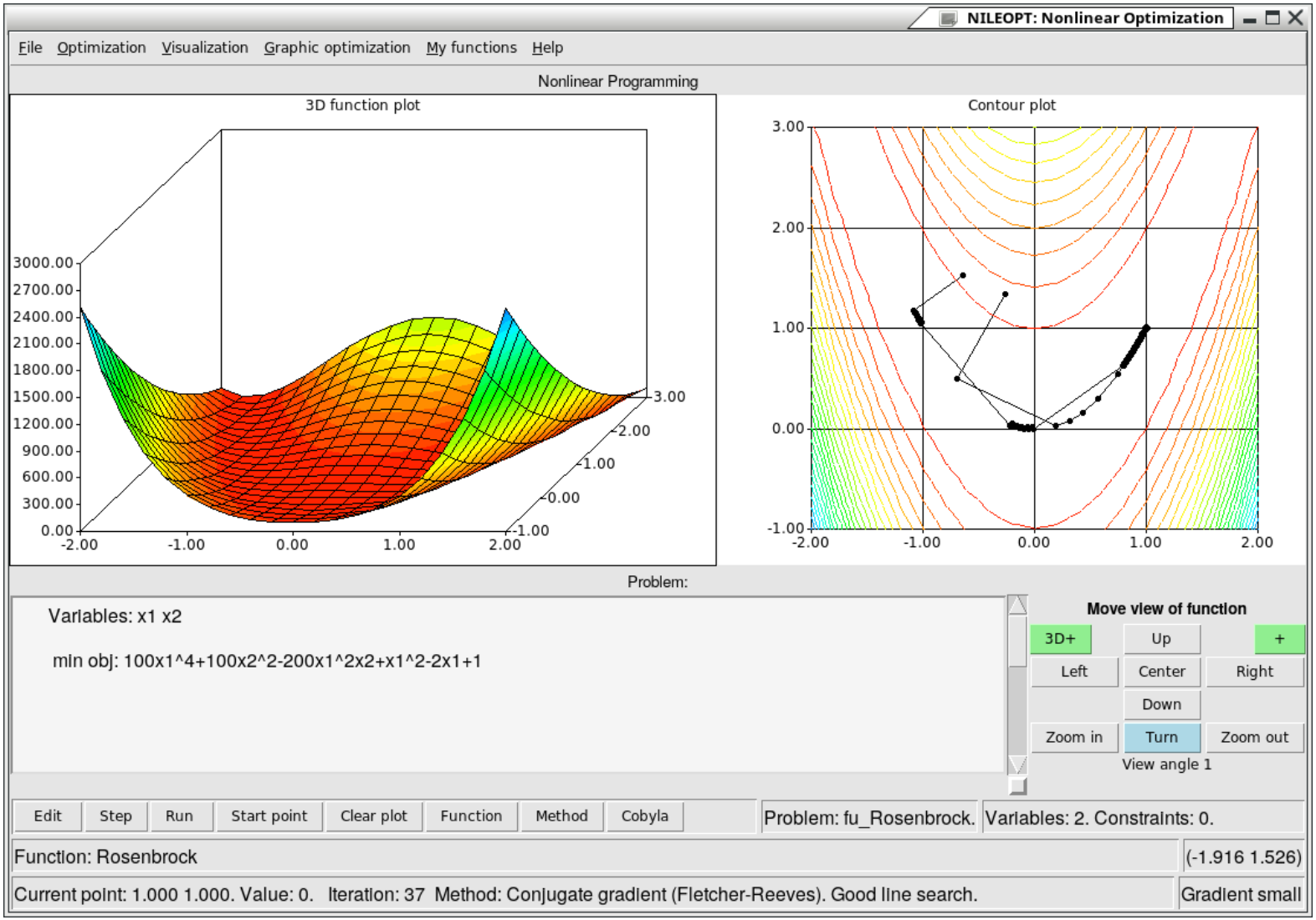
Nileopt: Rosenbrock: Steepest descent



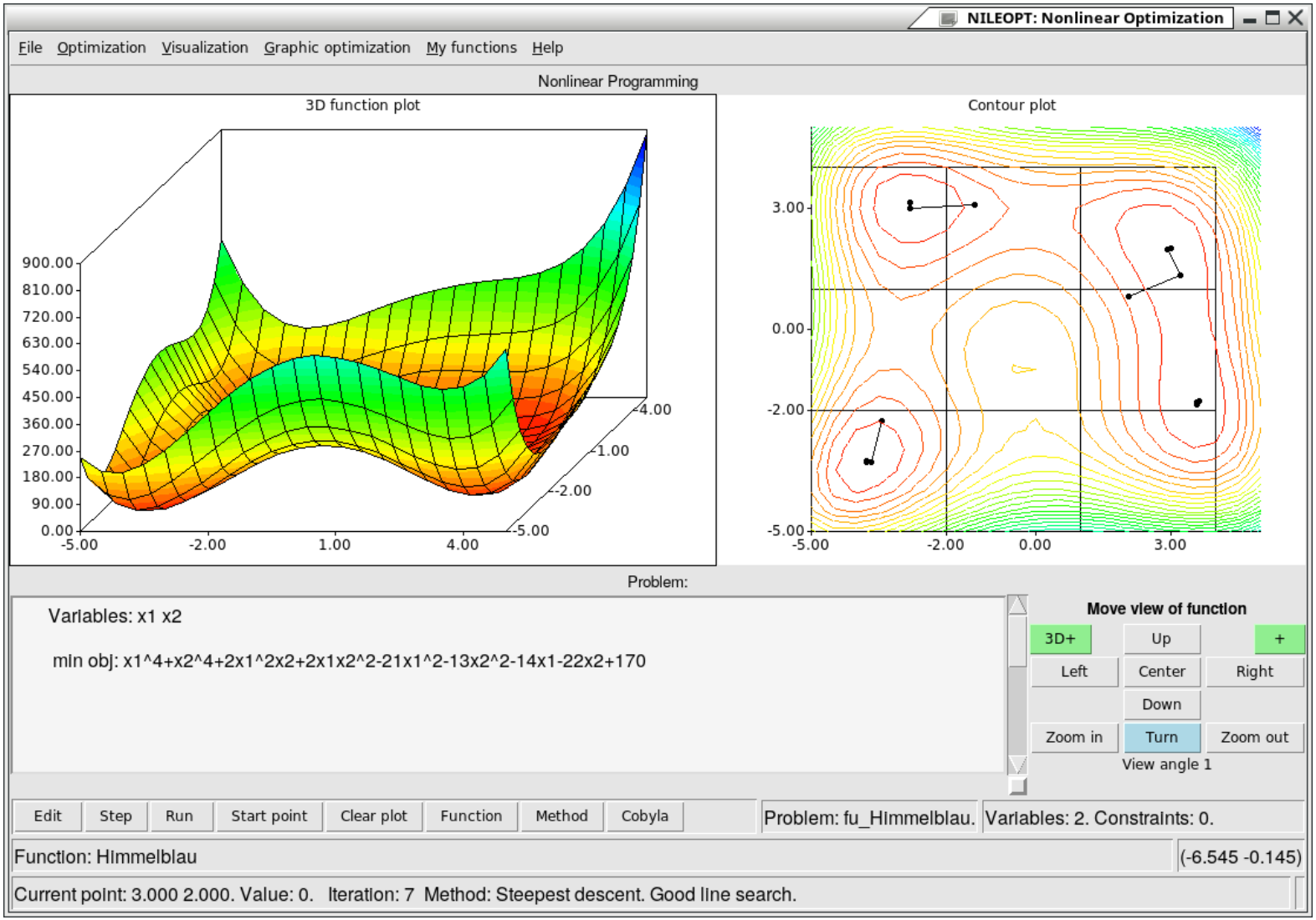
Nileopt: Rosenbrock: Steepest descent



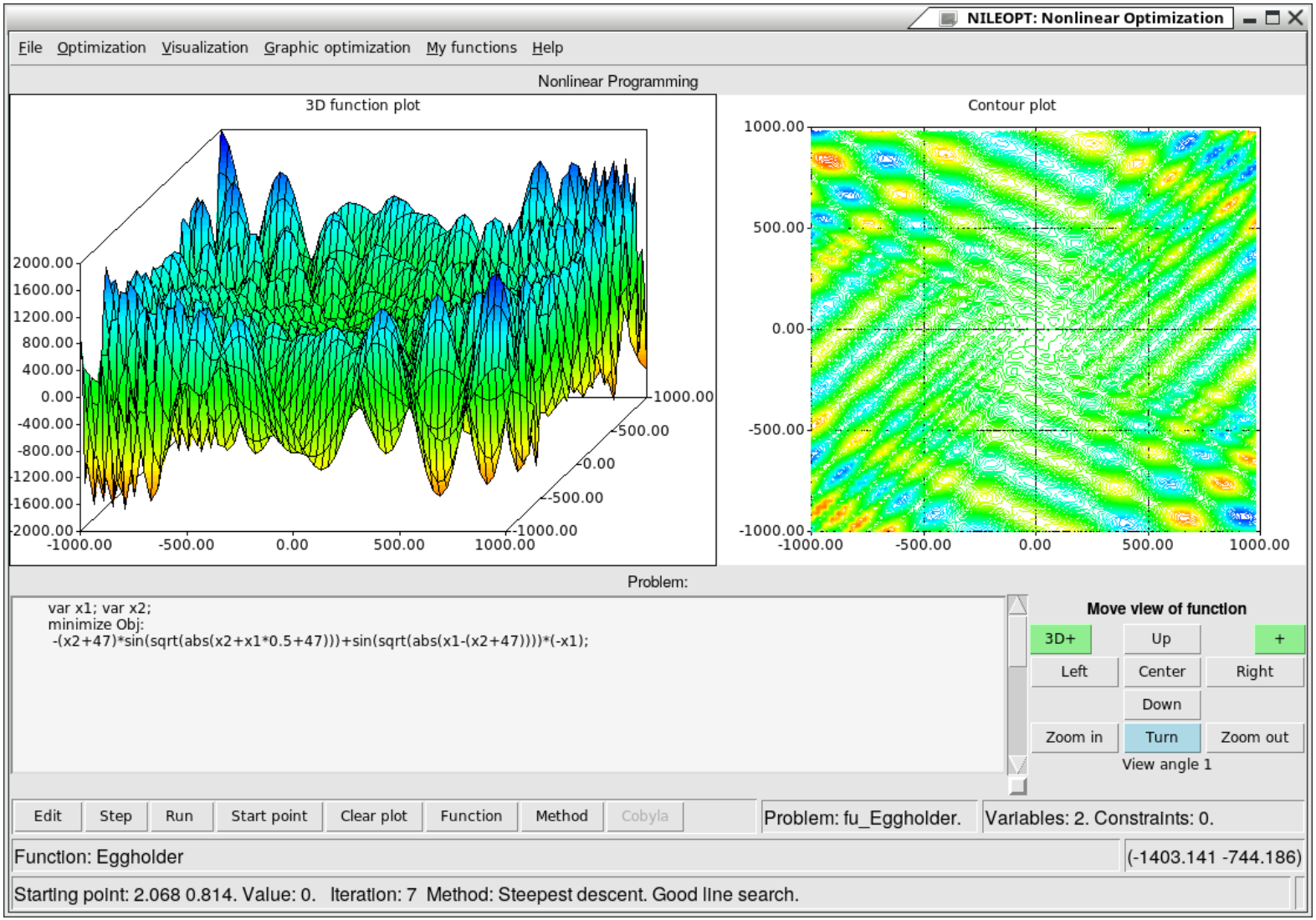
Nileopt: Rosenbrock: Steepest descent - conjugate gradient



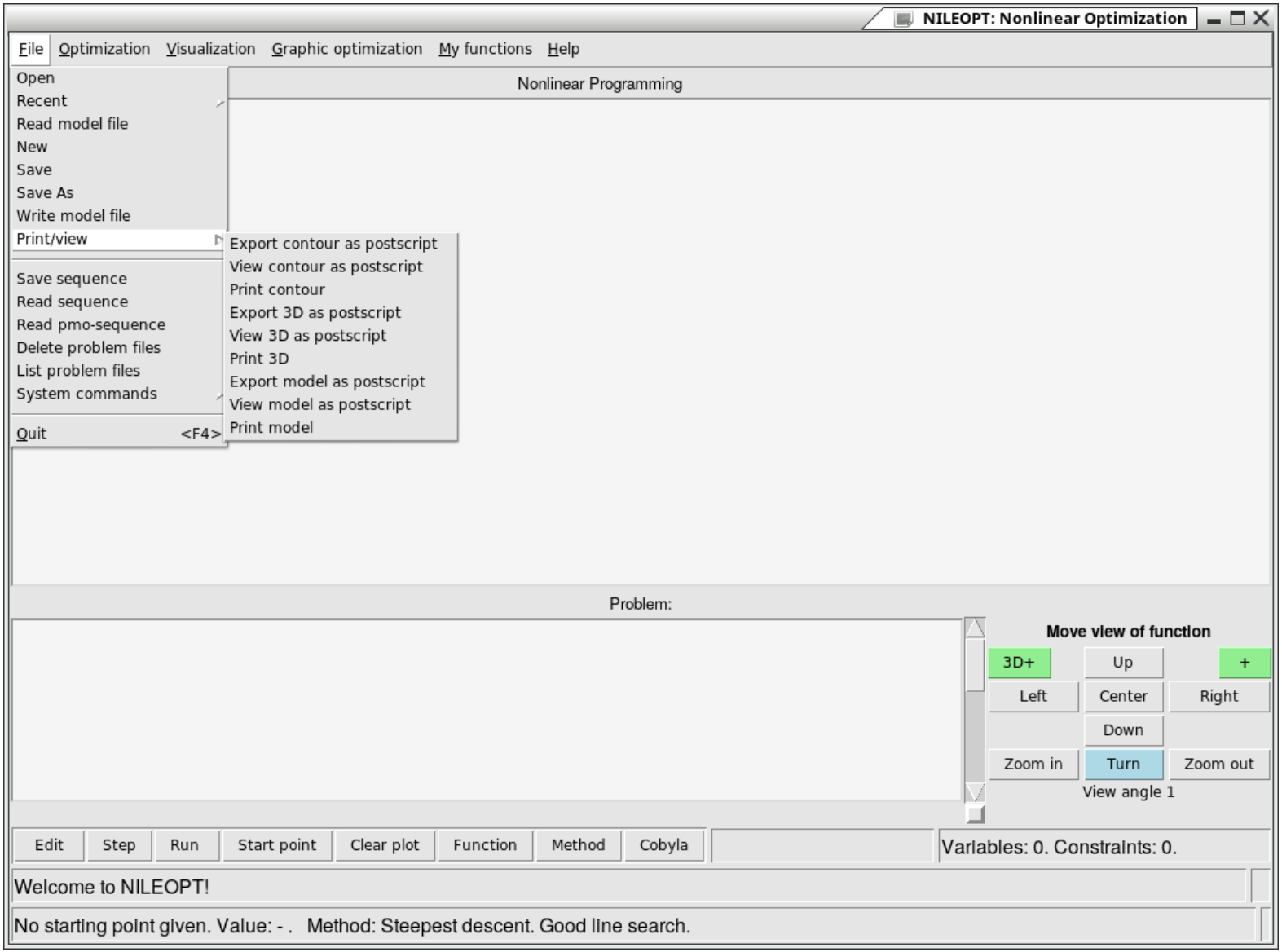
Nileopt: Himmelblau, local optima



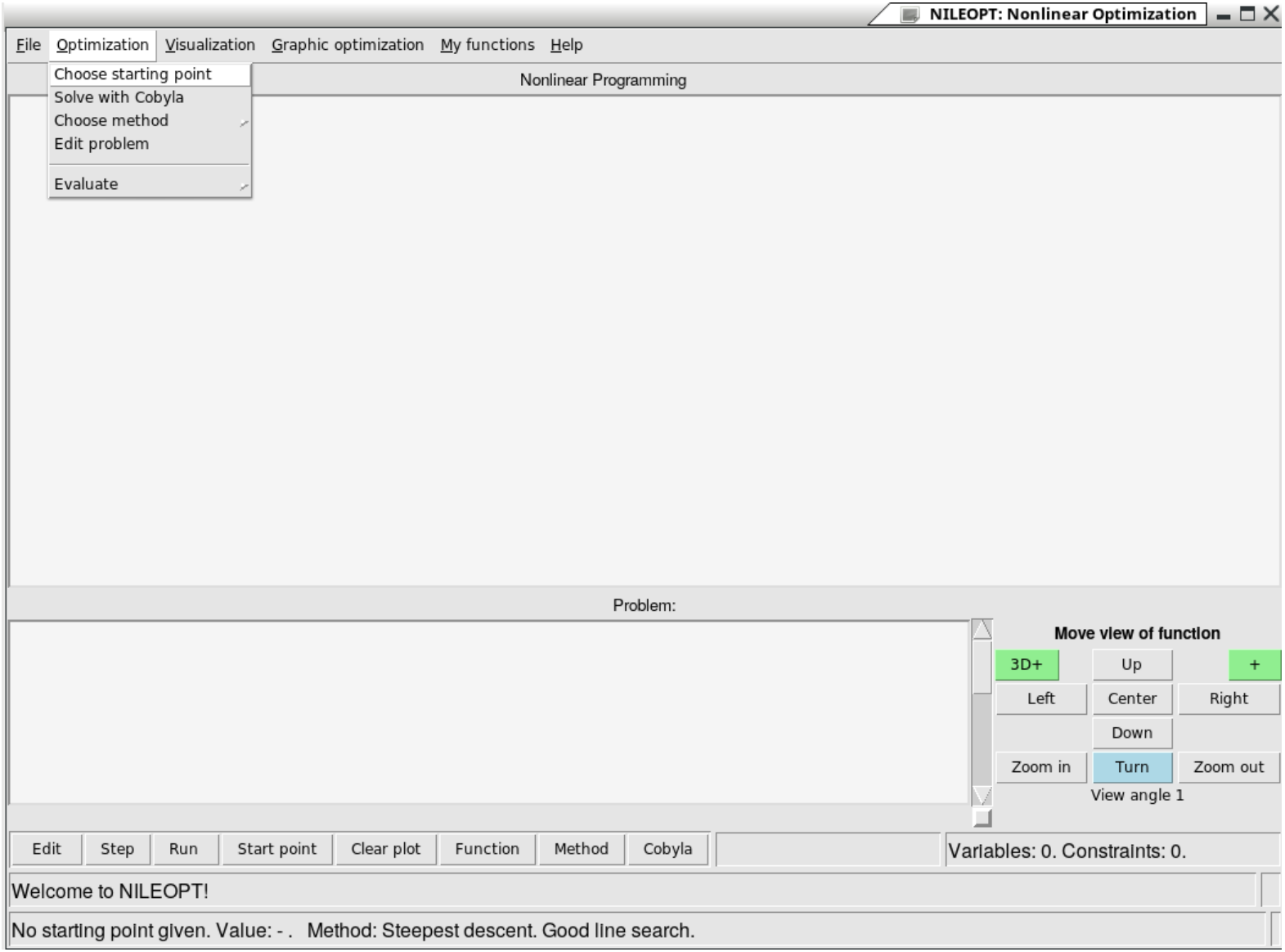
Nileopt: Eggholder



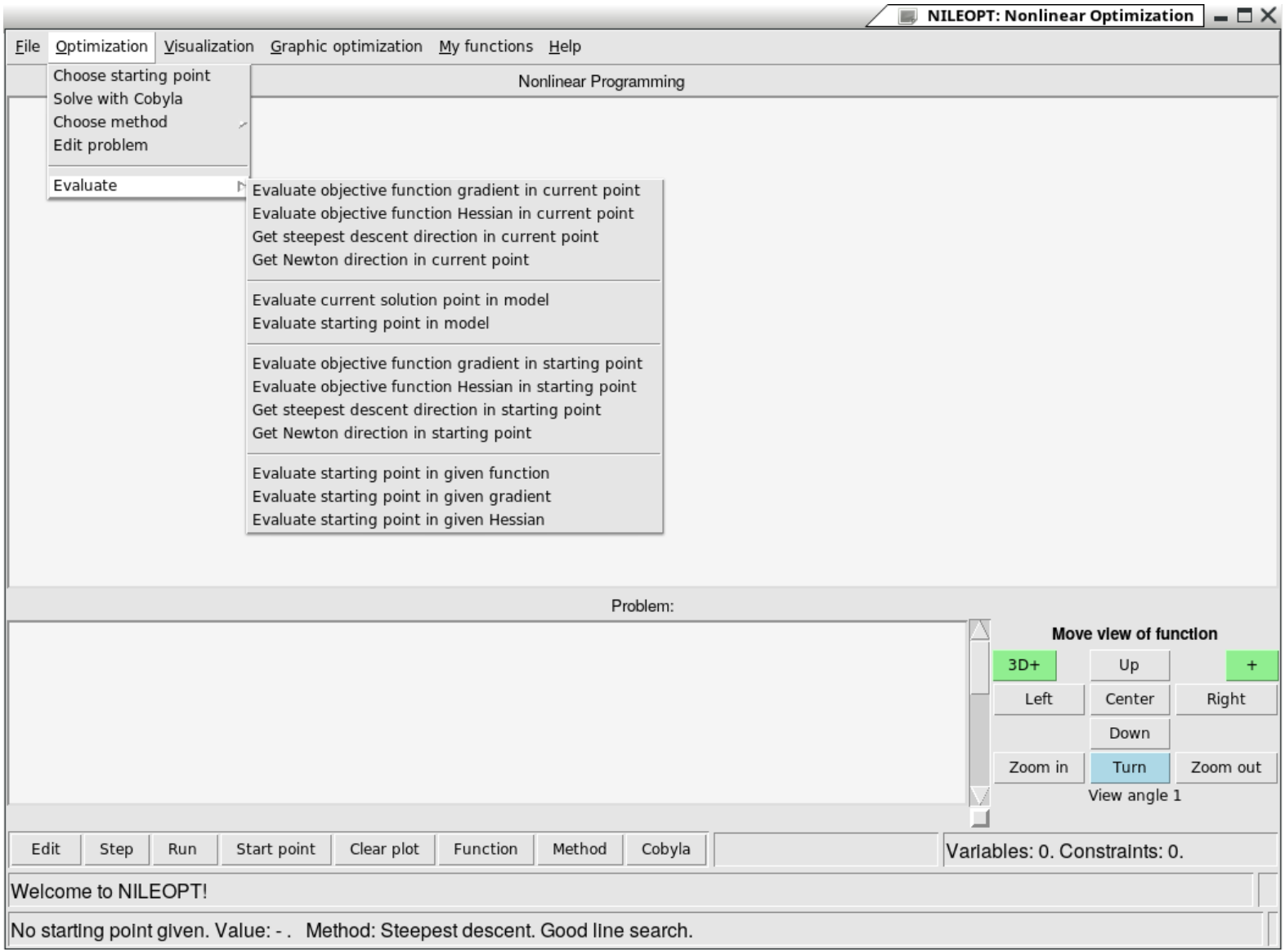
Nileopt menu 1



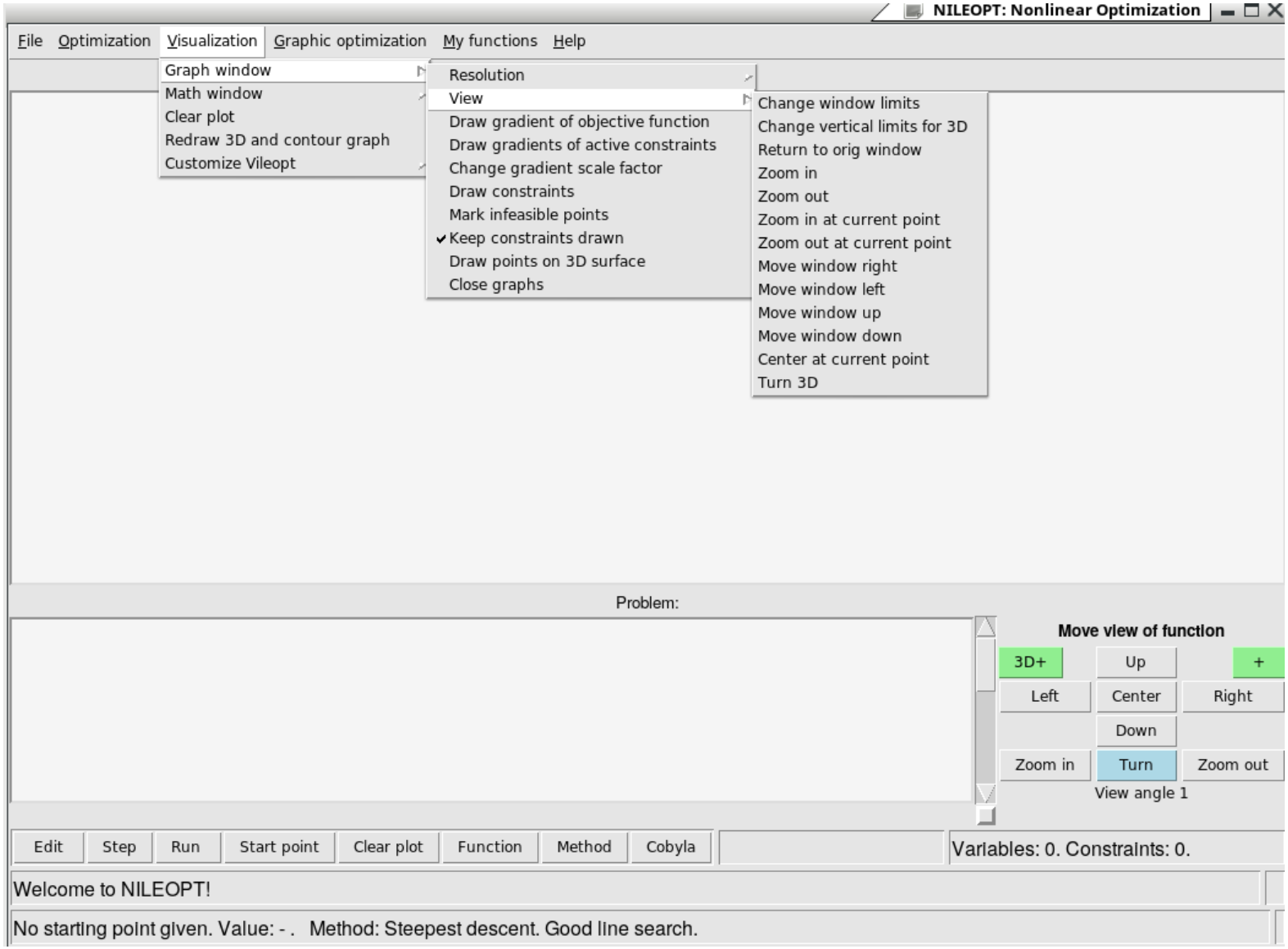
Nileopt menu 2



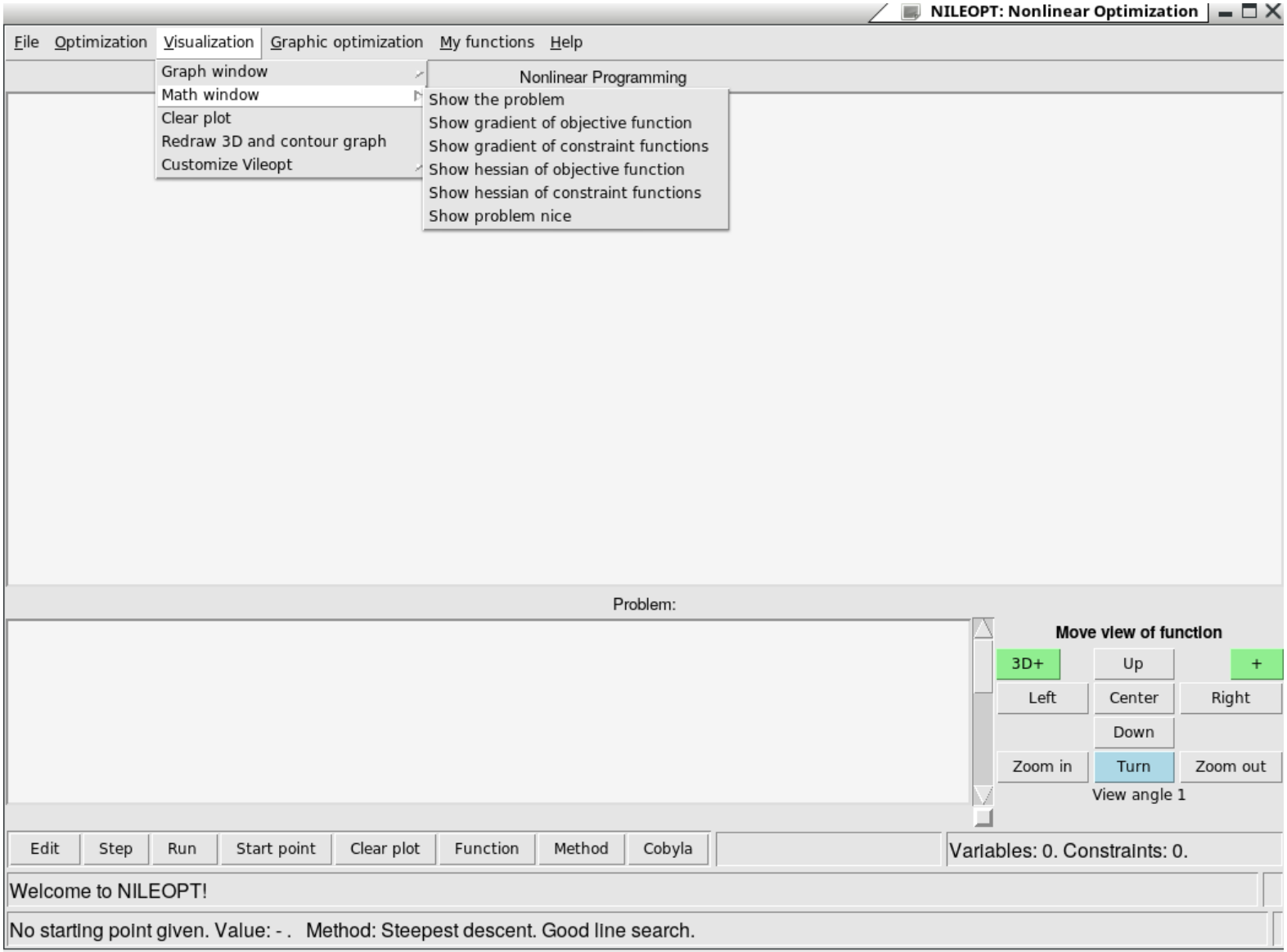
Nileopt menu 2b



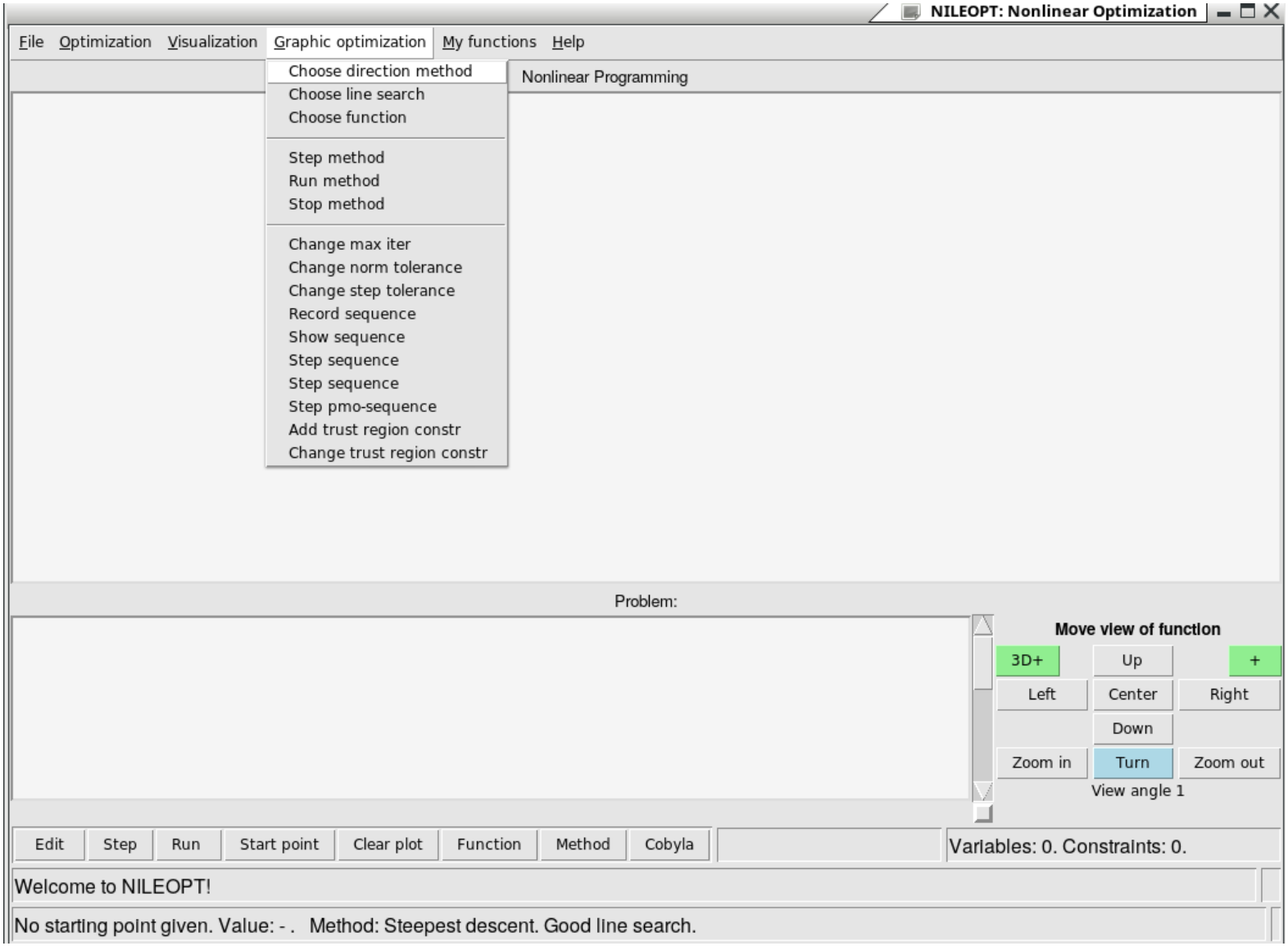
Nileopt menu 3a



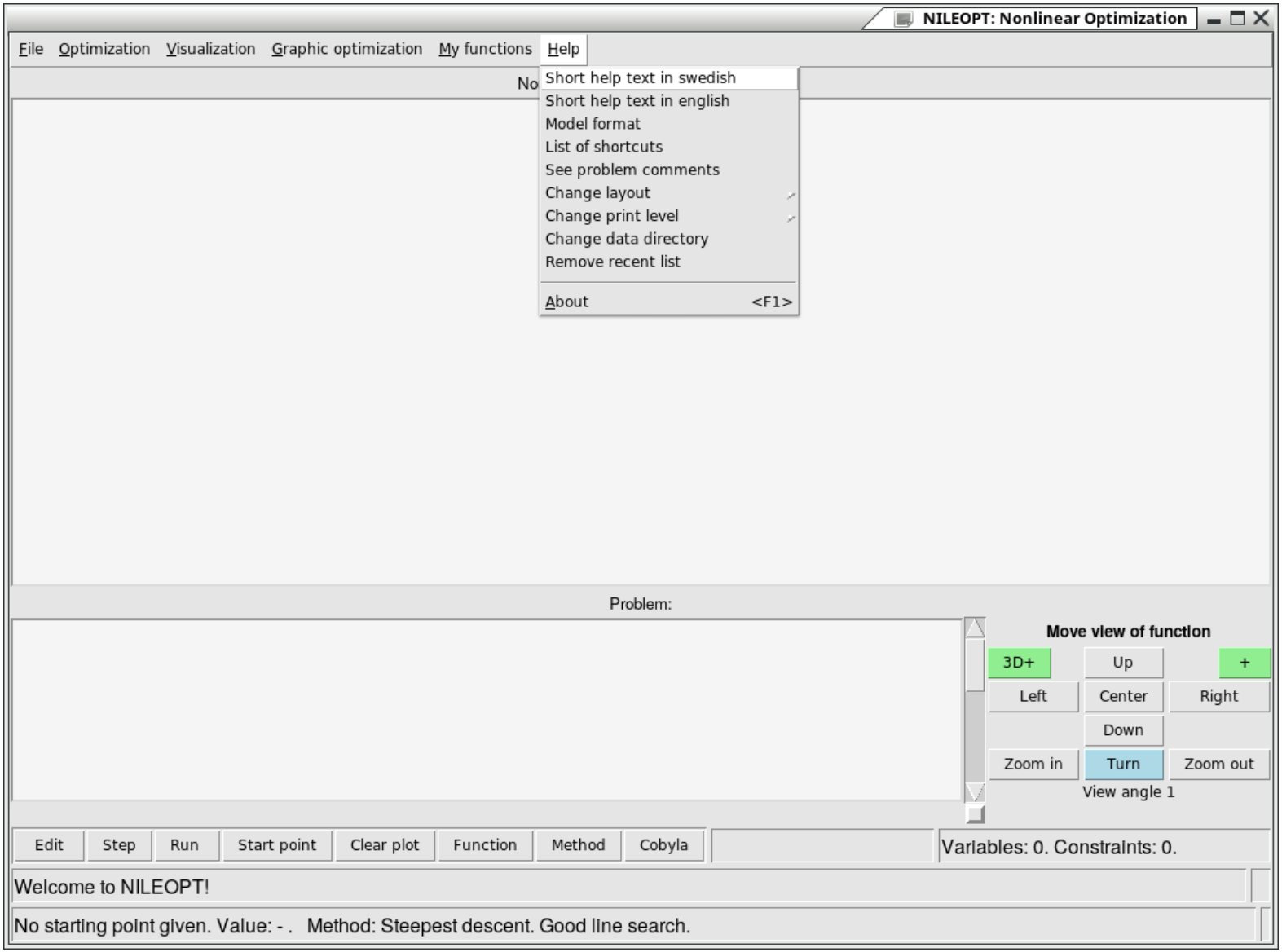
Nileopt menu 3b



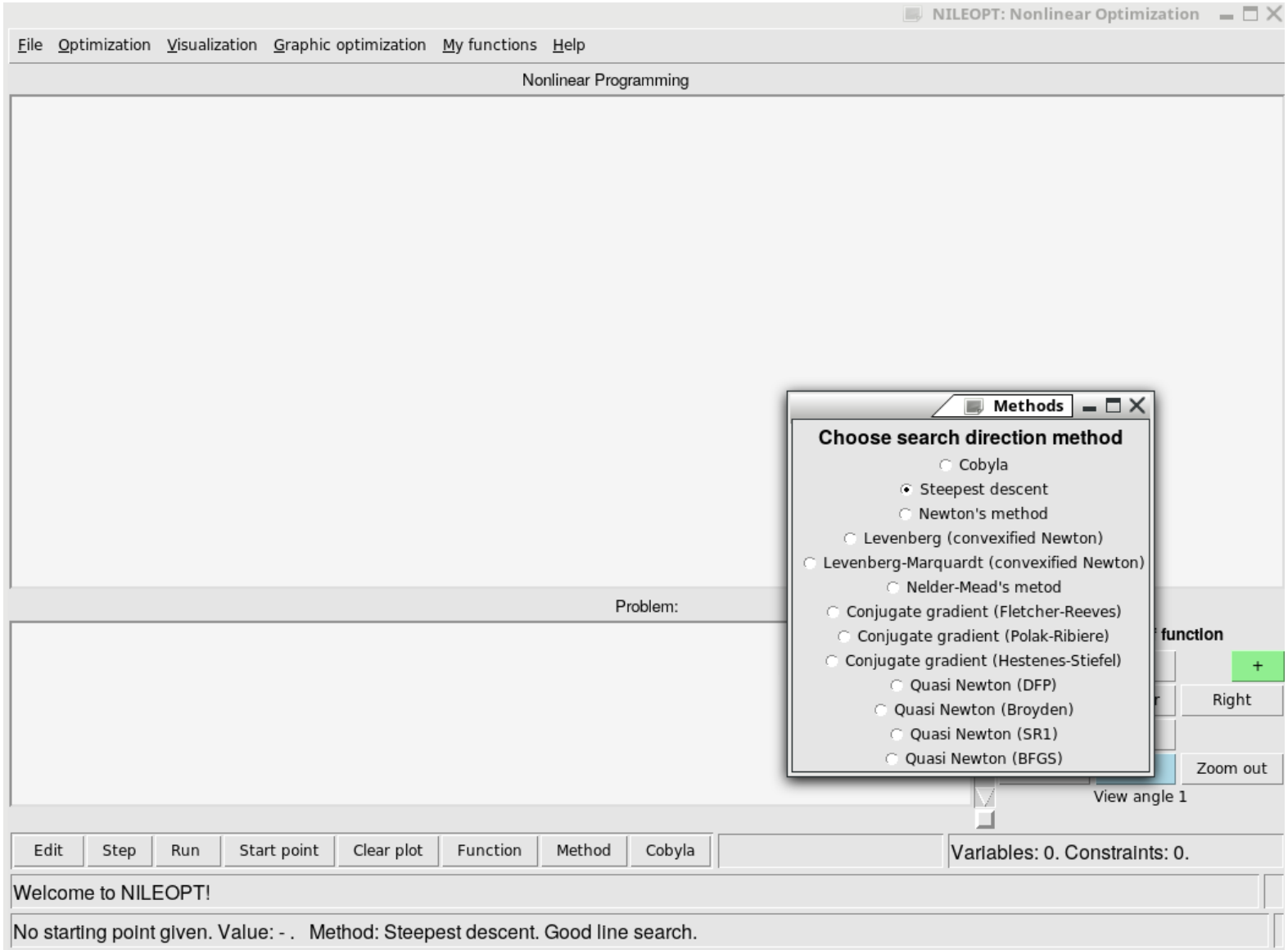
Nileopt menu 4



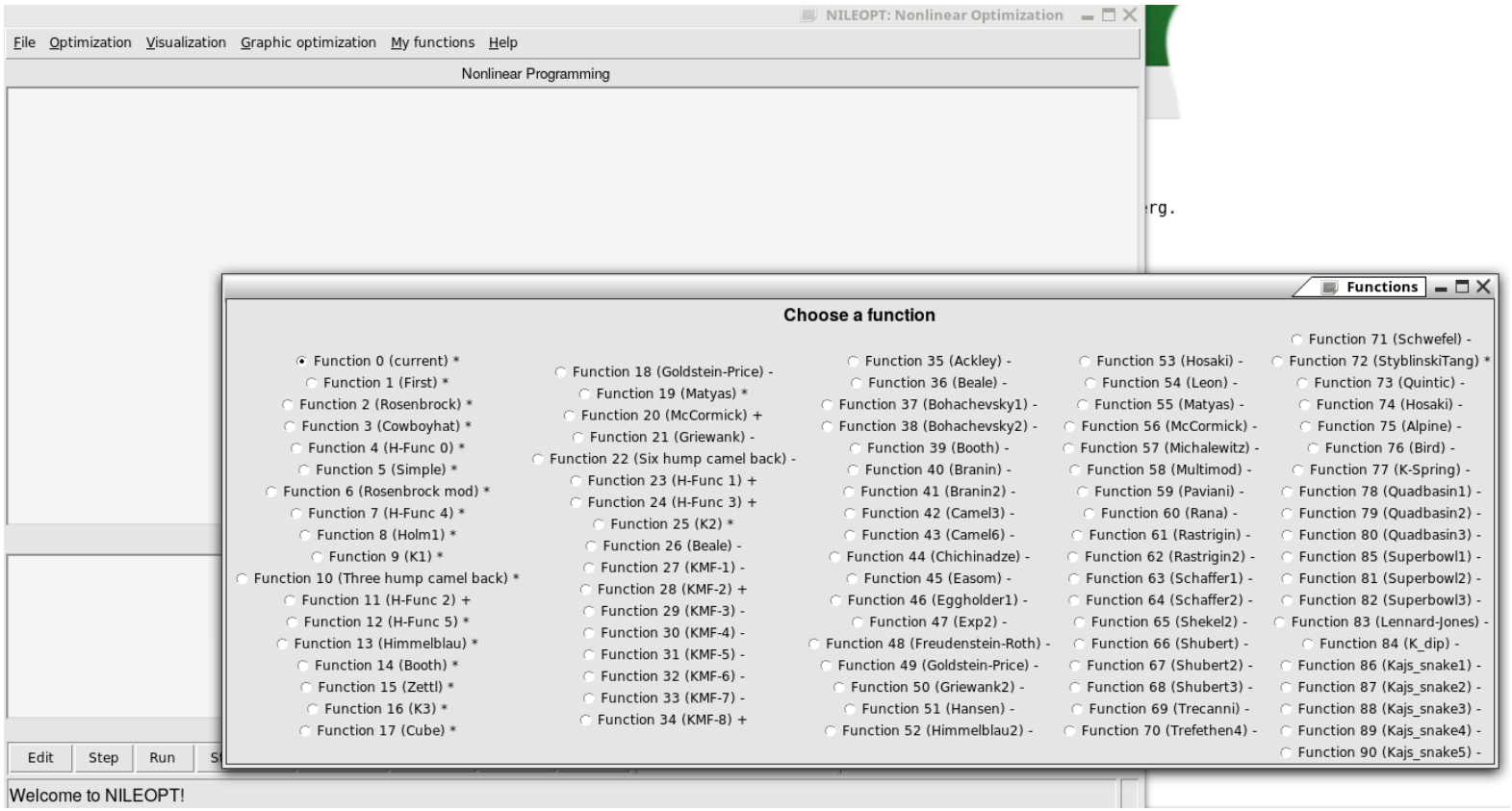
Nileopt menu 5



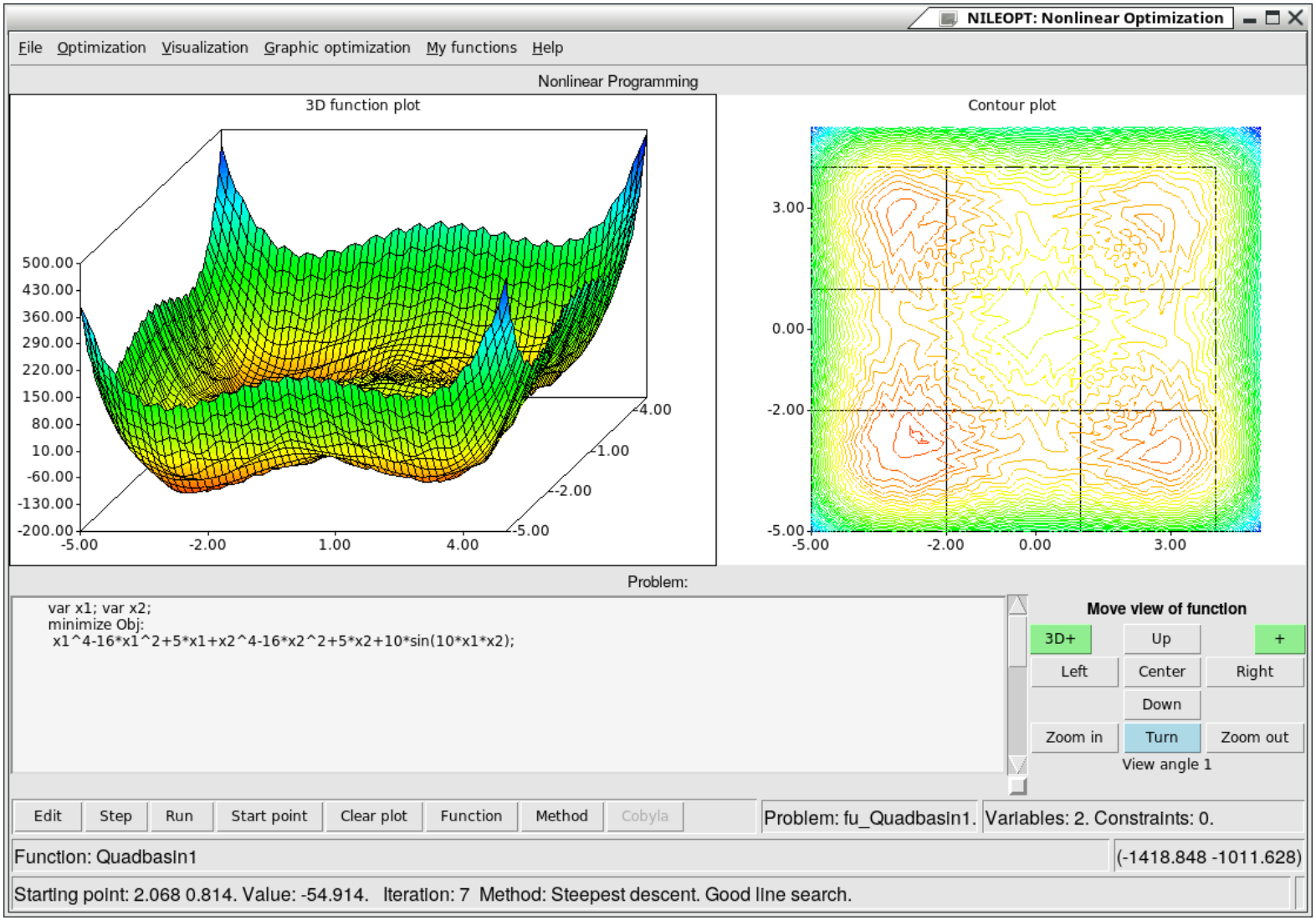
Nileopt menu 6



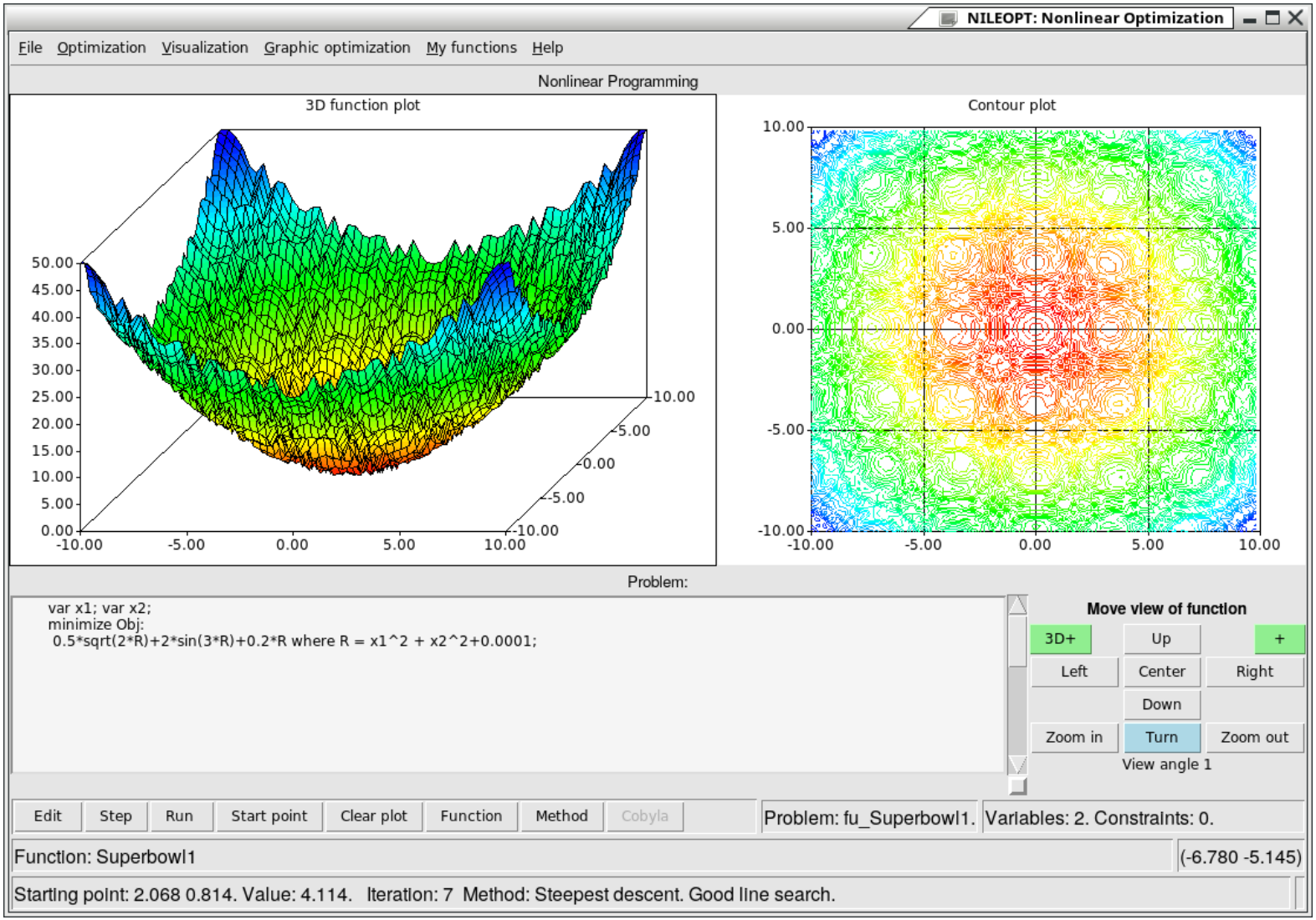
Nileopt menu 7



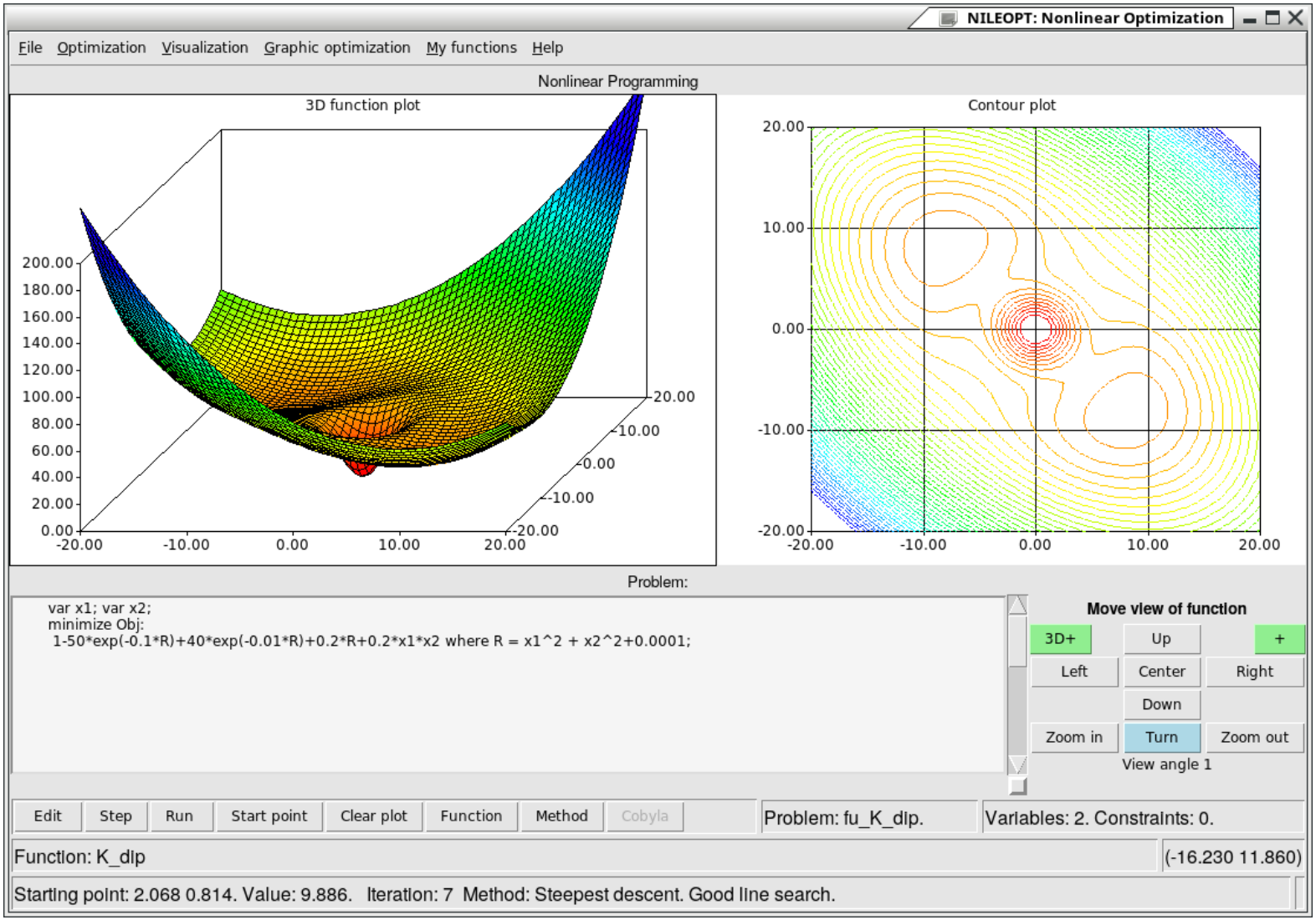
Nileopt: Quadbasin



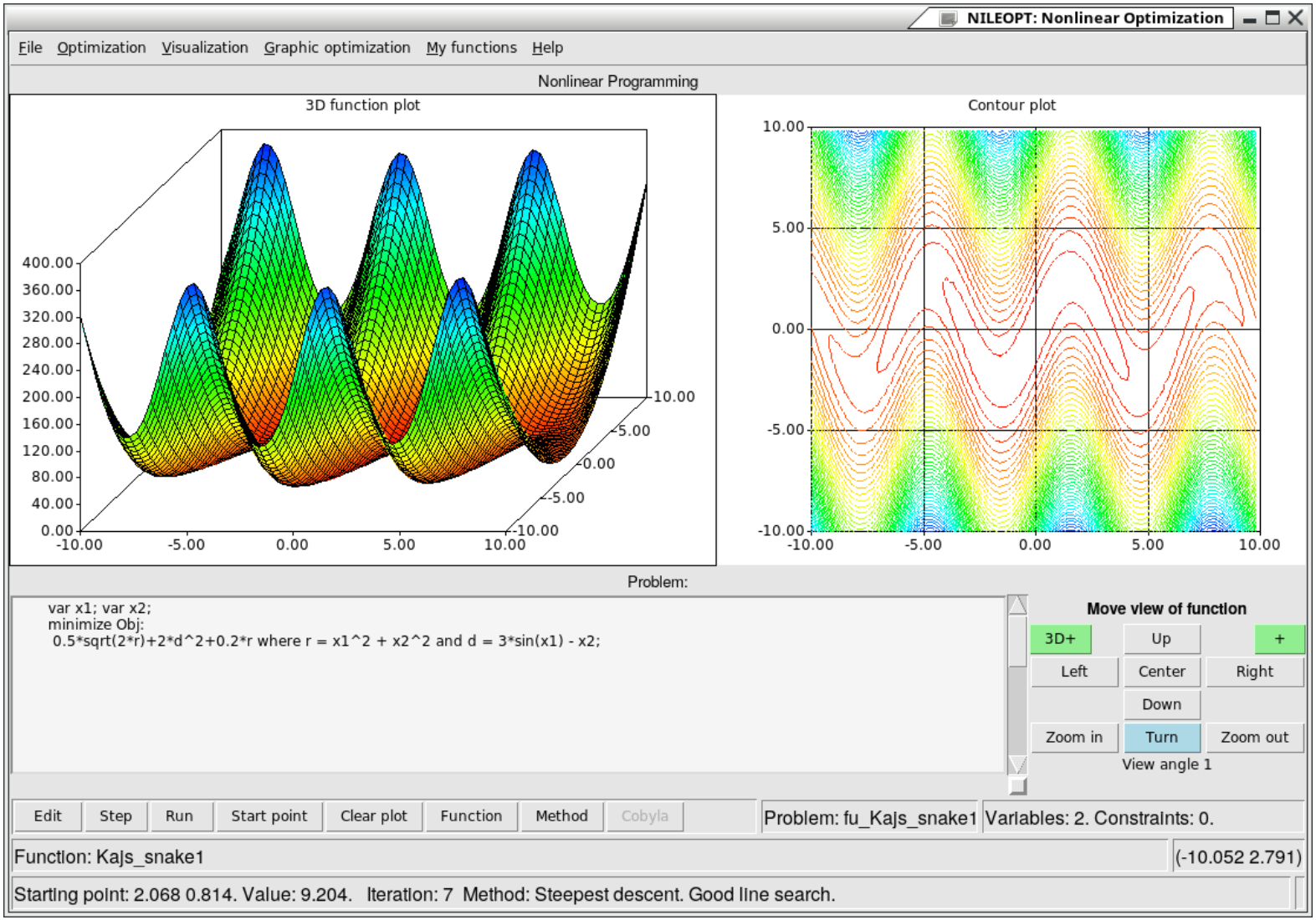
Nileopt: Superbowl



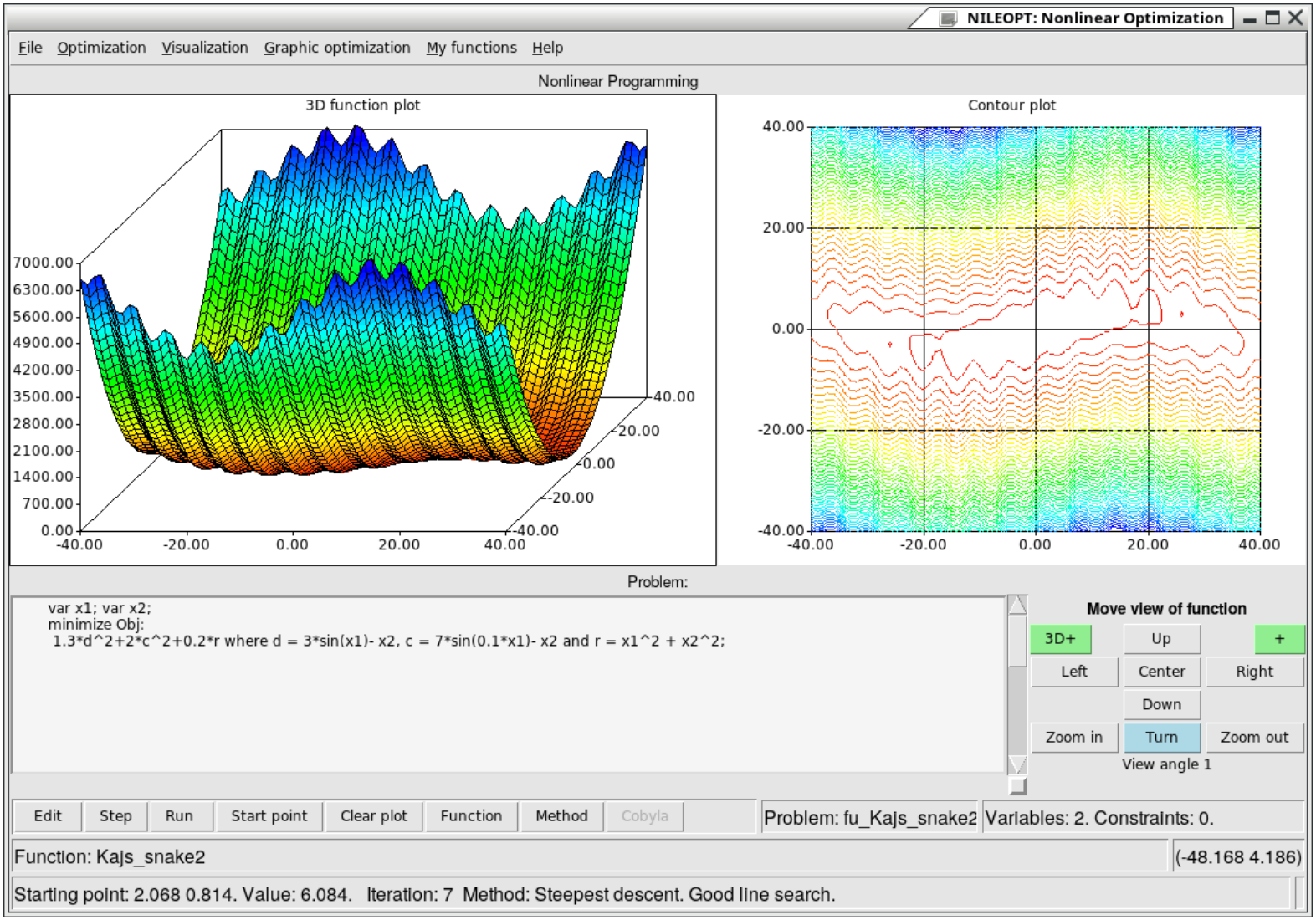
Nileopt: Dip


NILEOPT: Nonlinear Optimization
File Optimization Visualization Graphic optimization My functions Help
Nonlinear Programming
3D function plot
Contour plot
Problem:
var x1; var x2;
minimize Obj:
1-50*exp(-0.1*R)+40*exp(-0.01*R)+0.2*R+0.2*x1*x2 where R = x1^2 + x2^2+0.0001;
Move view of function
3D+
Up
+
Left
Center
Right
Down
Zoom in
Turn
Zoom out
View angle 1
Edit
Step
Run
Start point
Clear plot
Function
Method
Cobyla
Problem: fu_K_dip.
Variables: 2. Constraints: 0.
Function: K_dip
(-16.230 11.860)
Starting point: 2.068 0.814. Value: 9.886. Iteration: 7 Method: Steepest descent. Good line search.

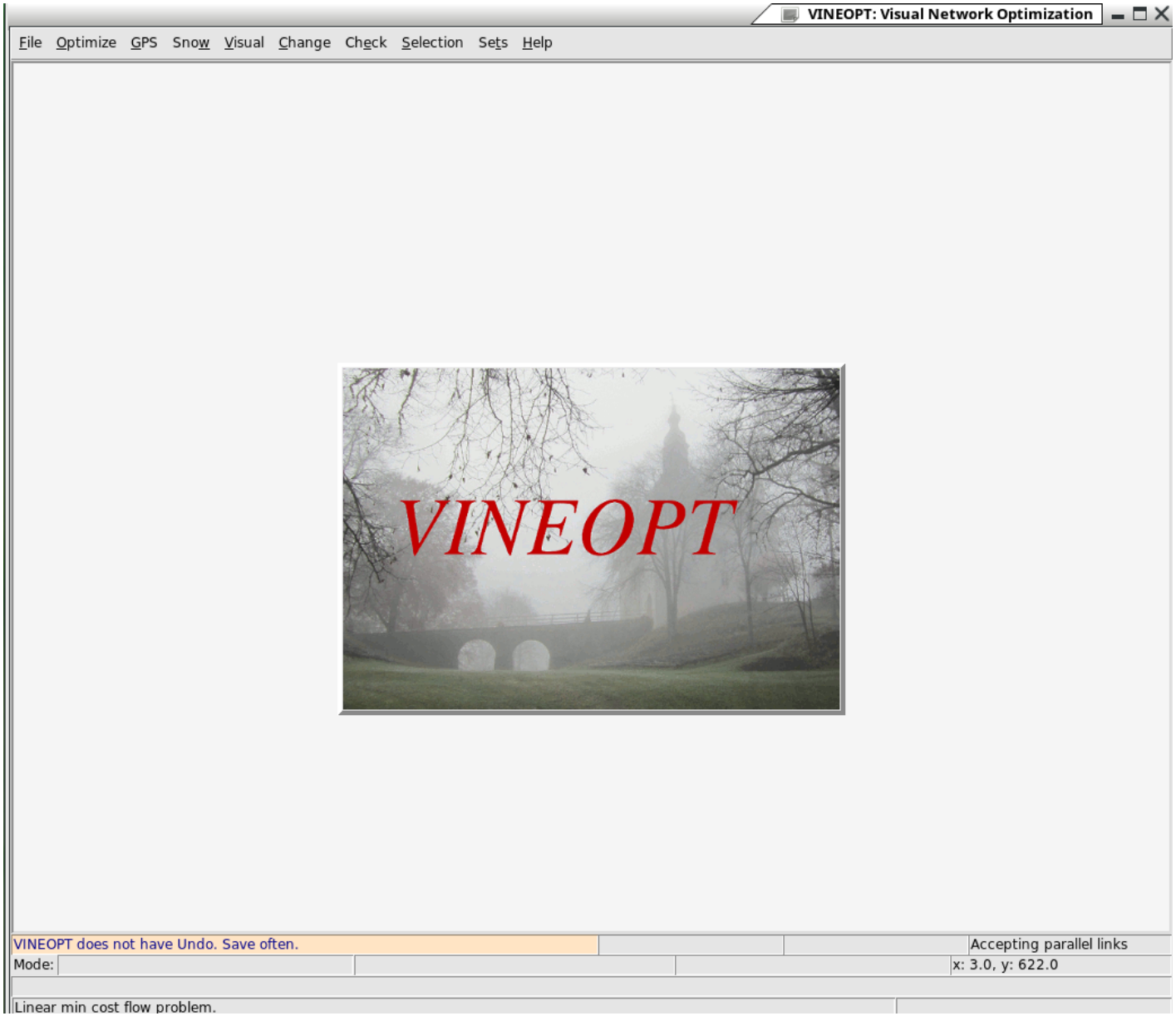
Nileopt: Kaj's snake 1



Nileopt: Kaj's snake 2



Vineopt starting



Vineopt purpose

Create, save, read, change network problems

Vineopt purpose

Create, save, read, change network problems (of different types).

Vineopt purpose

Create, save, read, change network problems (of different types).

Solve network optimization problems

Vineopt purpose

Create, save, read, change network problems (of different types).

Solve network optimization problems (of many types).

Vineopt purpose

Create, save, read, change network problems (of different types).

Solve network optimization problems (of many types).

View the graph and solution

Vineopt purpose

Create, save, read, change network problems (of different types).

Solve network optimization problems (of many types).

View the graph and solution (in many different ways).

Vineopt purpose

Create, save, read, change network problems (of different types).

Solve network optimization problems (of many types).

View the graph and solution (in many different ways).

Zoom, move picture.

Vineopt purpose

Create, save, read, change network problems (of different types).

Solve network optimization problems (of many types).

View the graph and solution (in many different ways).

Zoom, move picture.

Show OpenStreetMap as background.

Vineopt purpose

Create, save, read, change network problems (of different types).

Solve network optimization problems (of many types).

View the graph and solution (in many different ways).

Zoom, move picture.

Show OpenStreetMap as background.

Show node/link sets with colours.

Vineopt purpose

Create, save, read, change network problems (of different types).

Solve network optimization problems (of many types).

View the graph and solution (in many different ways).

Zoom, move picture.

Show OpenStreetMap as background.

Show node/link sets with colours.

Read and show GPS-tracks.

Vineopt purpose

Create, save, read, change network problems (of different types).

Solve network optimization problems (of many types).

View the graph and solution (in many different ways).

Zoom, move picture.

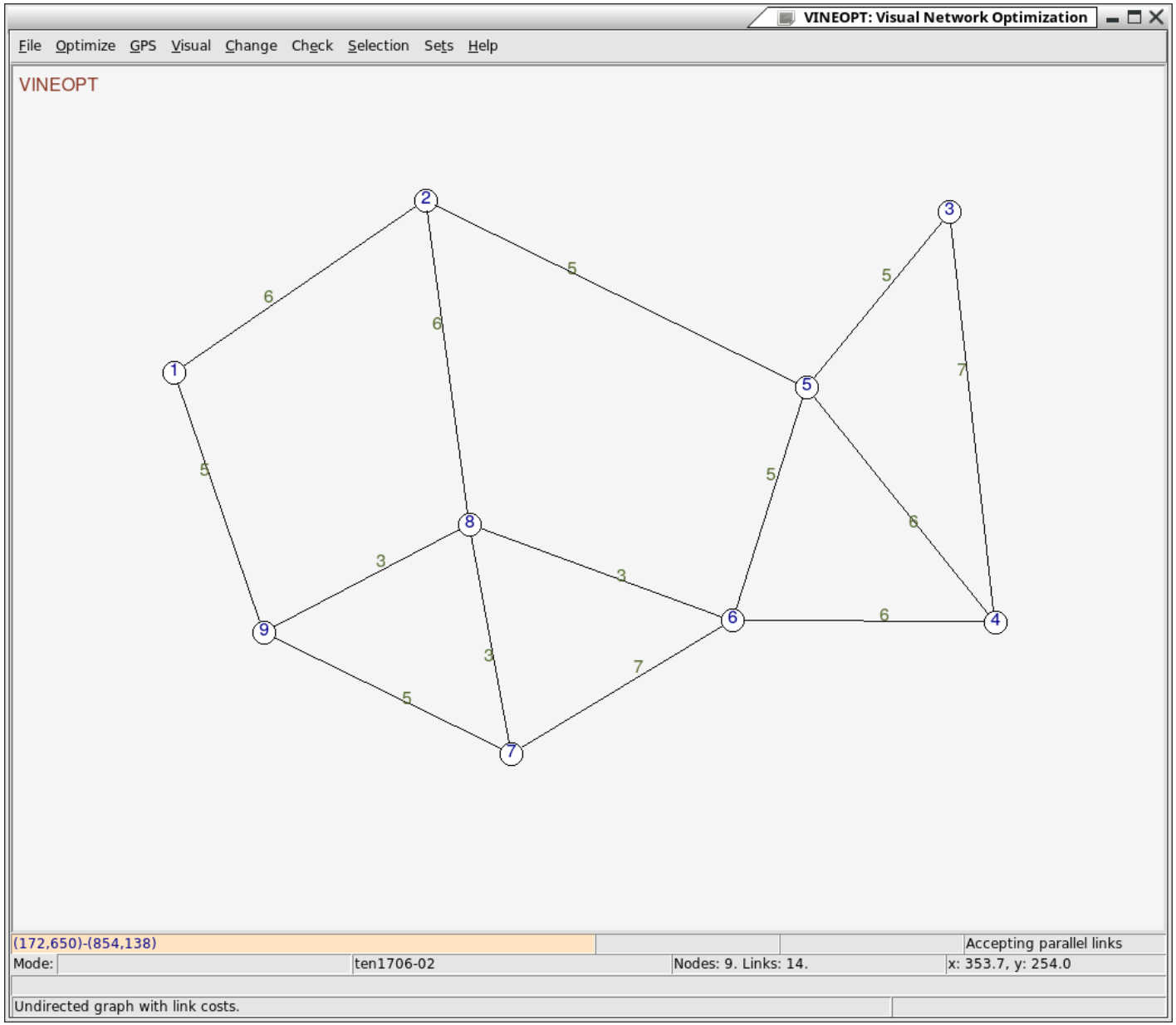
Show OpenStreetMap as background.

Show node/link sets with colours.

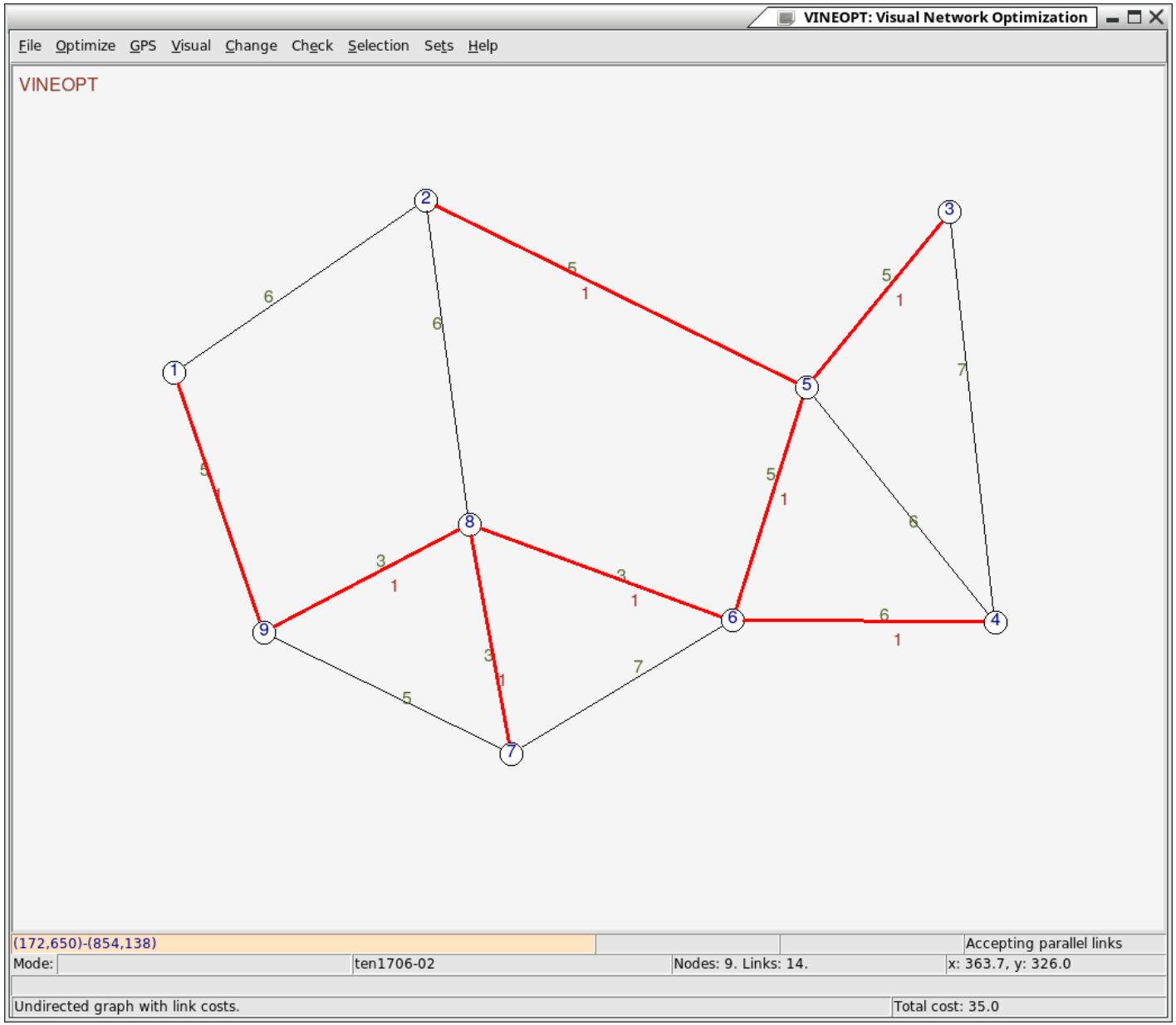
Read and show GPS-tracks.

Used for research in IP telecom and snow removal.

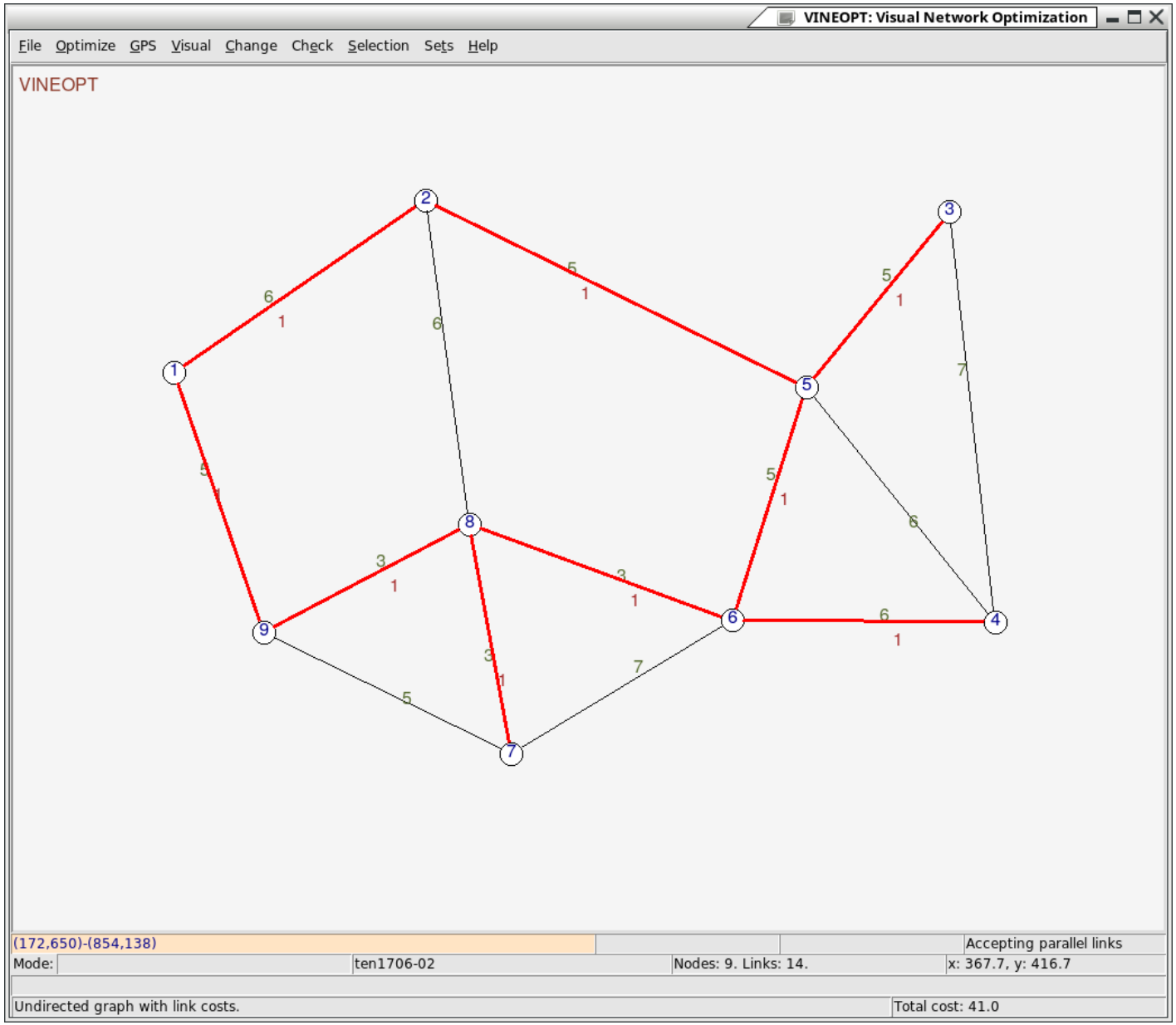
Vineopt: undirected graph



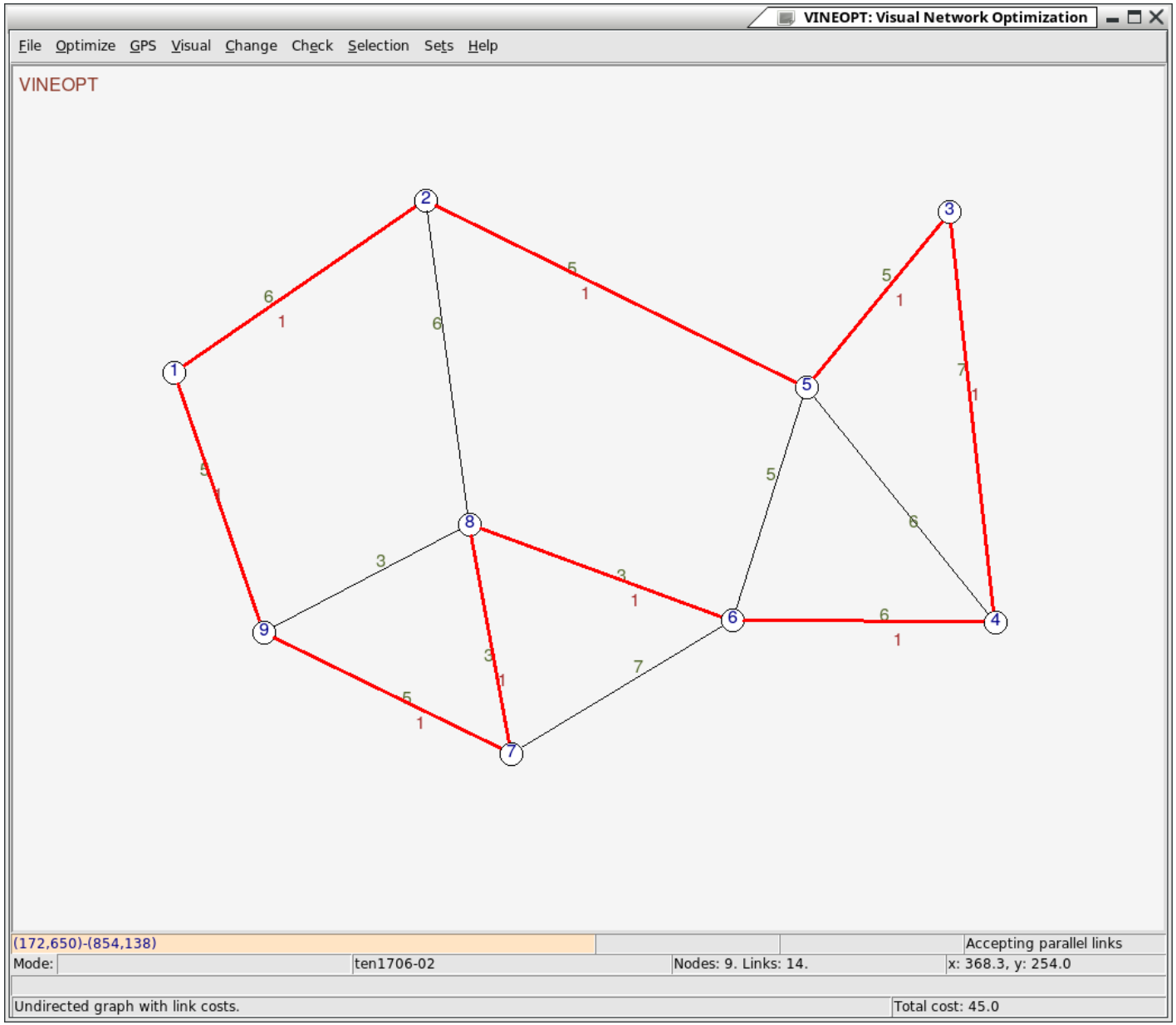
Vineopt: MST


VINEOPT: Visual Network Optimization
File Optimize GPS Visual Change Check Selection Sets Help
VINEOPT
(172,650)-(854,138)
Accepting parallel links
Mode:
ten1706-02
Nodes: 9. Links: 14.
x: 363.7, y: 326.0
Undirected graph with link costs.
Total cost: 35.0

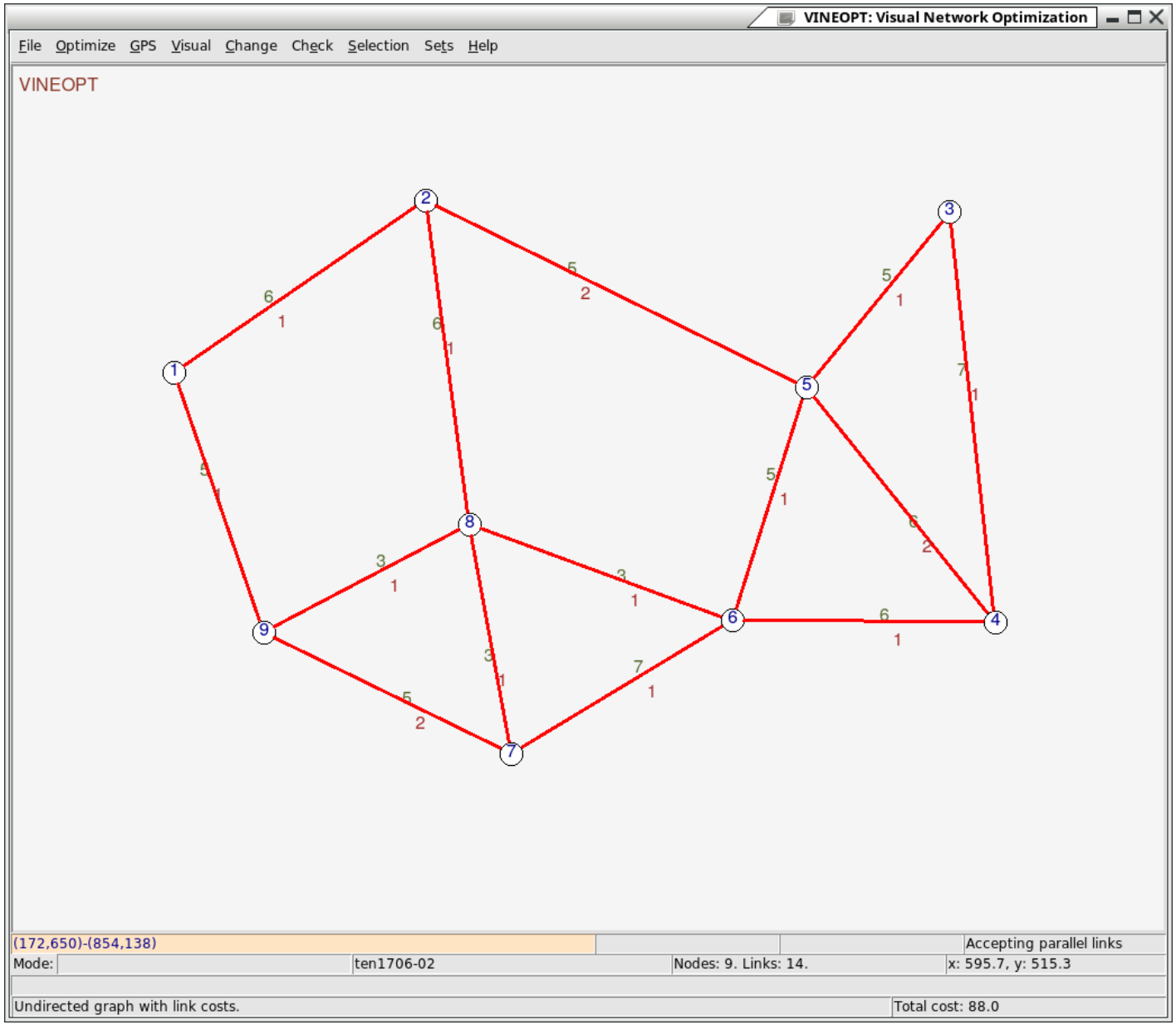
Vineopt: 1-tree



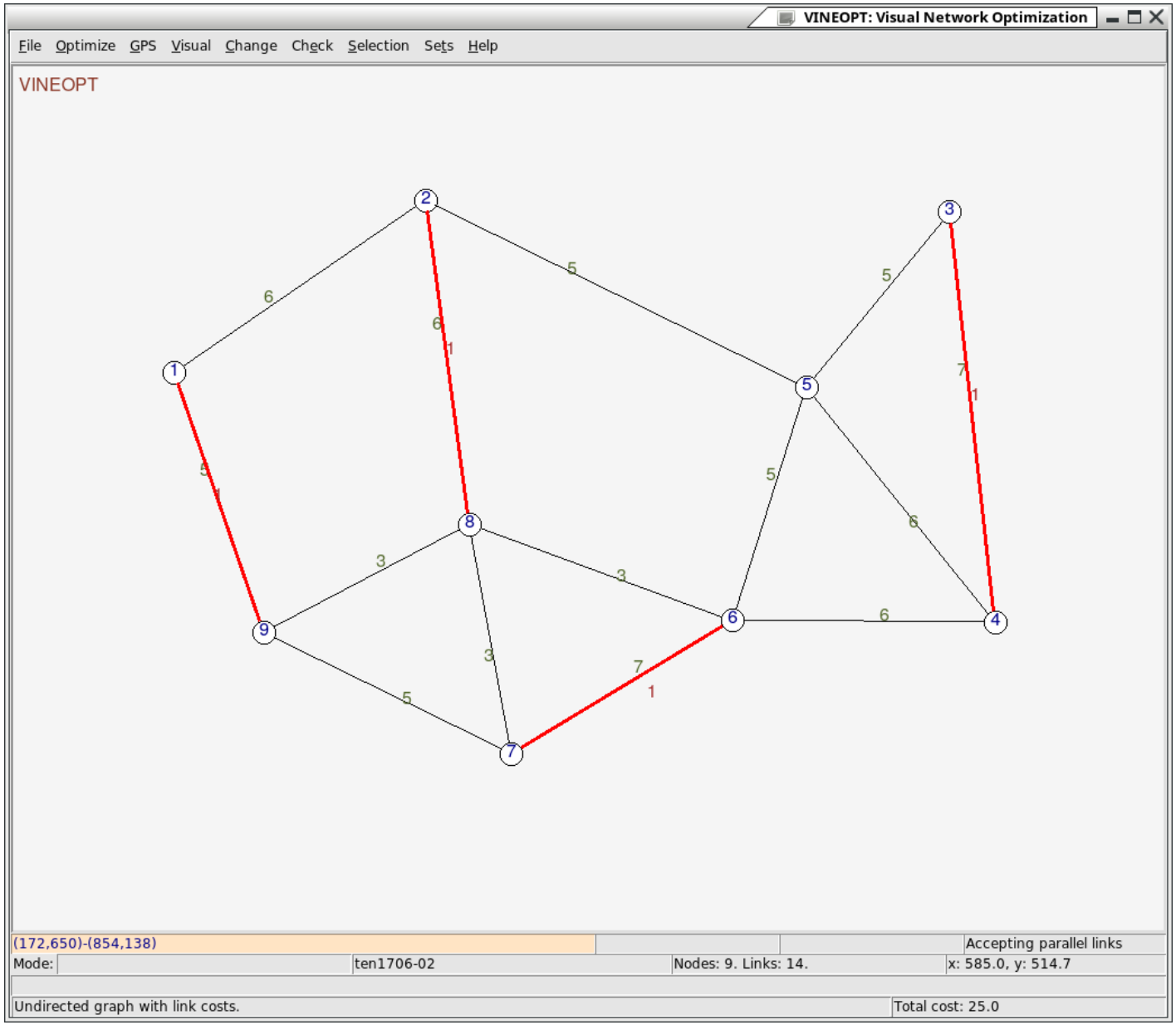
Vineopt: TSP


VINEOPT: Visual Network Optimization
File Optimize GPS Visual Change Check Selection Sets Help
VINEOPT
(172,650)-(854,138)
Accepting parallel links
Mode:
ten1706-02
Nodes: 9. Links: 14.
x: 368.3, y: 254.0
Undirected graph with link costs.
Total cost: 45.0

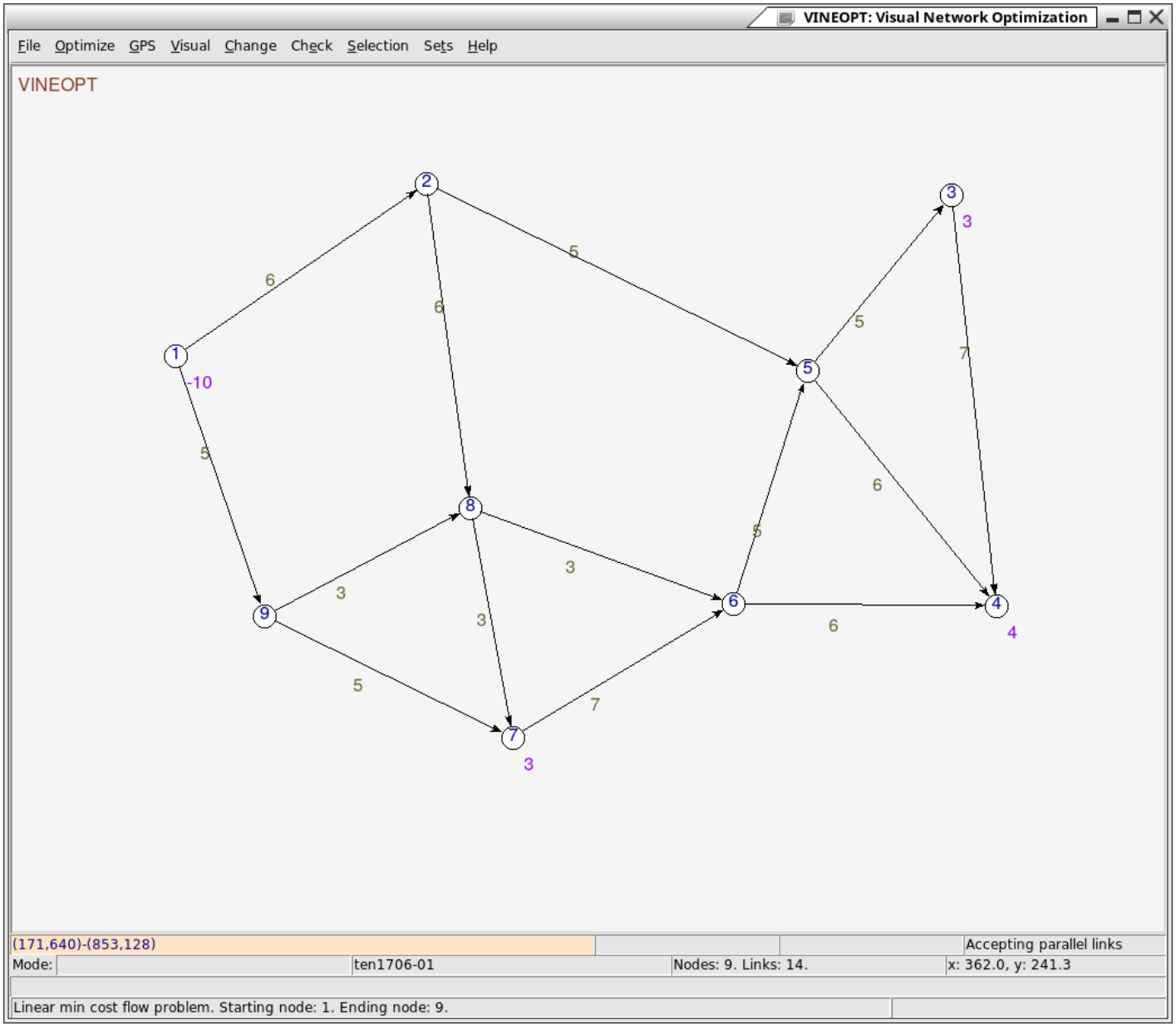
Vineopt: Chinese postman



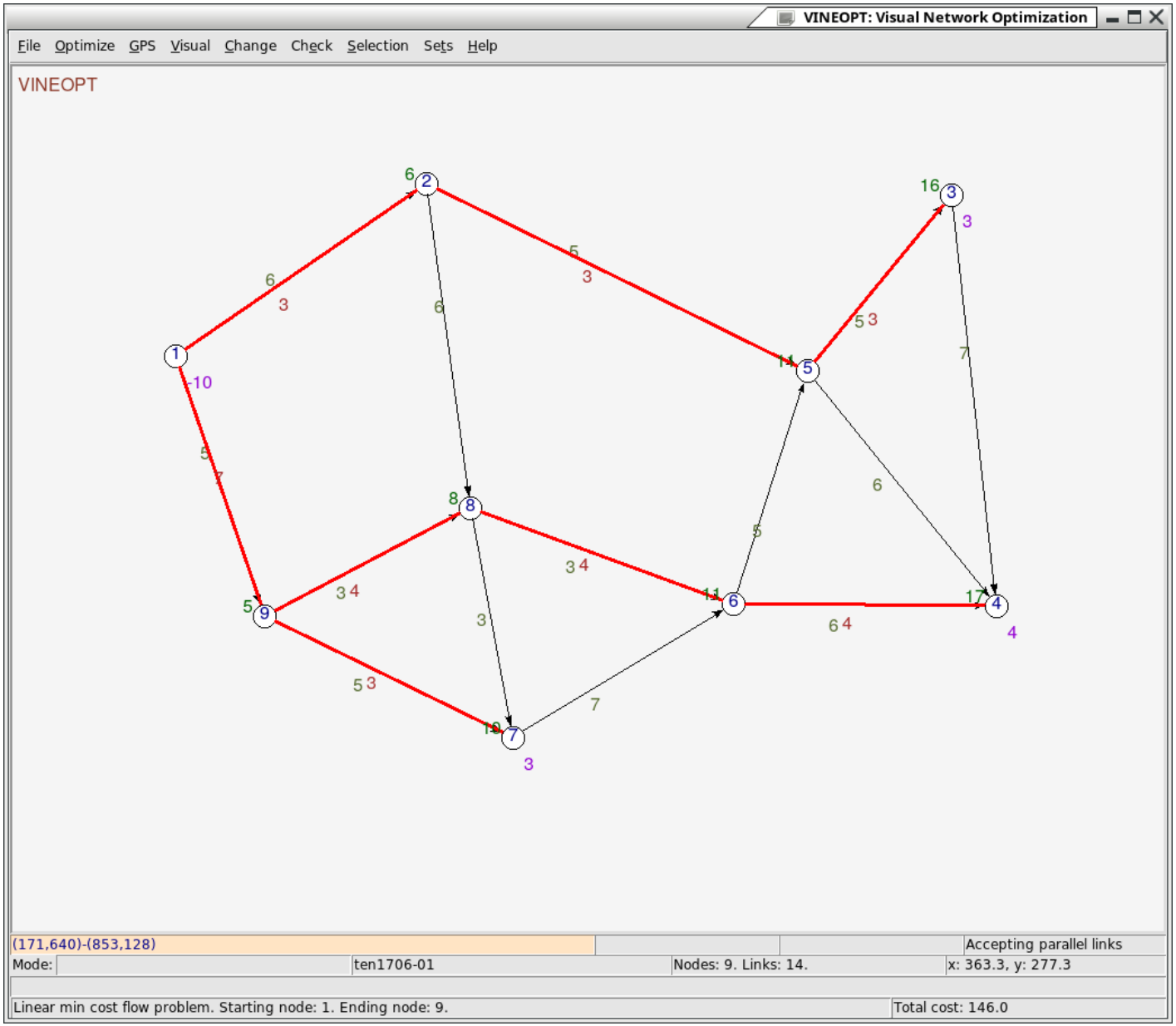
Vineopt: matching



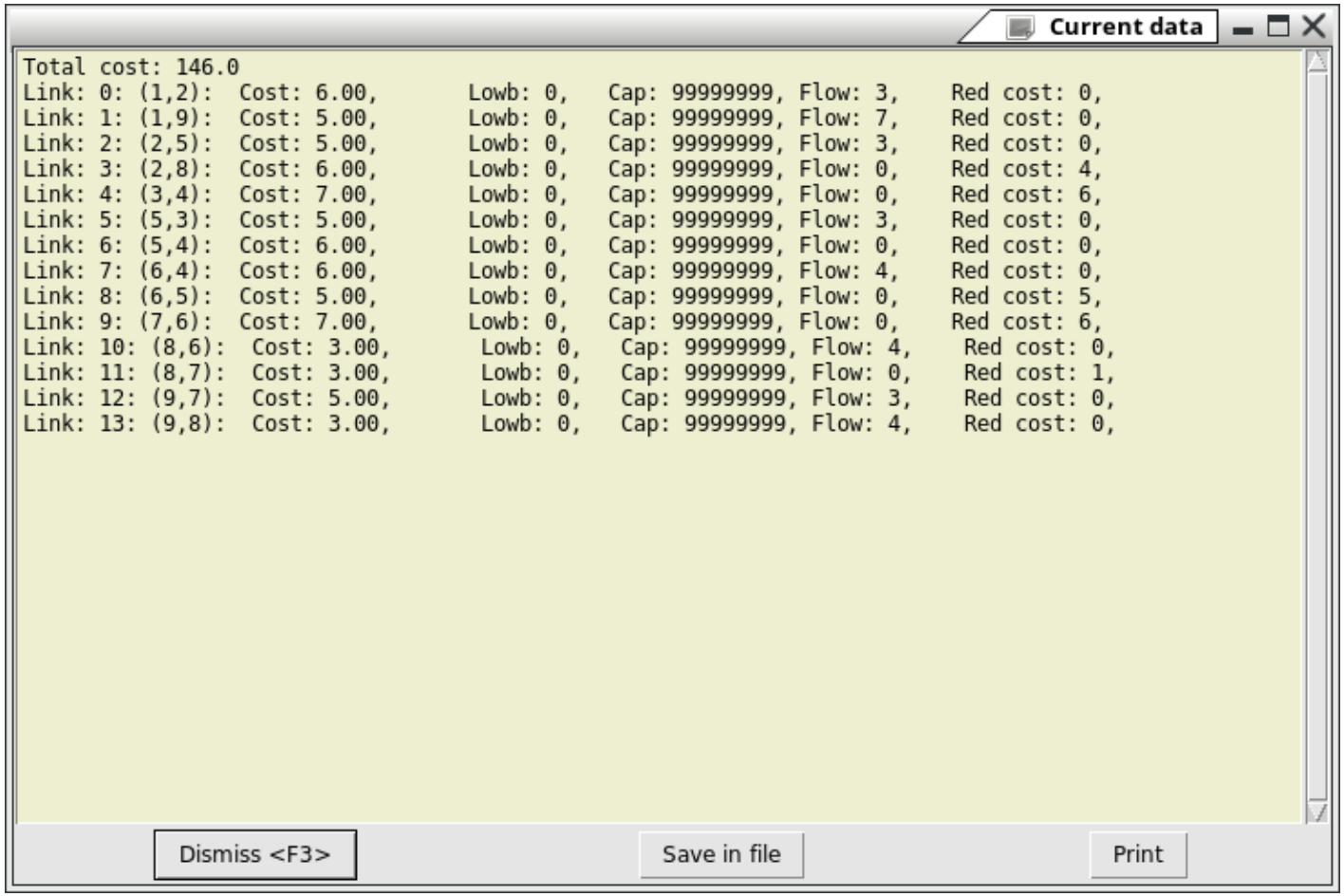
Vineopt: directed network



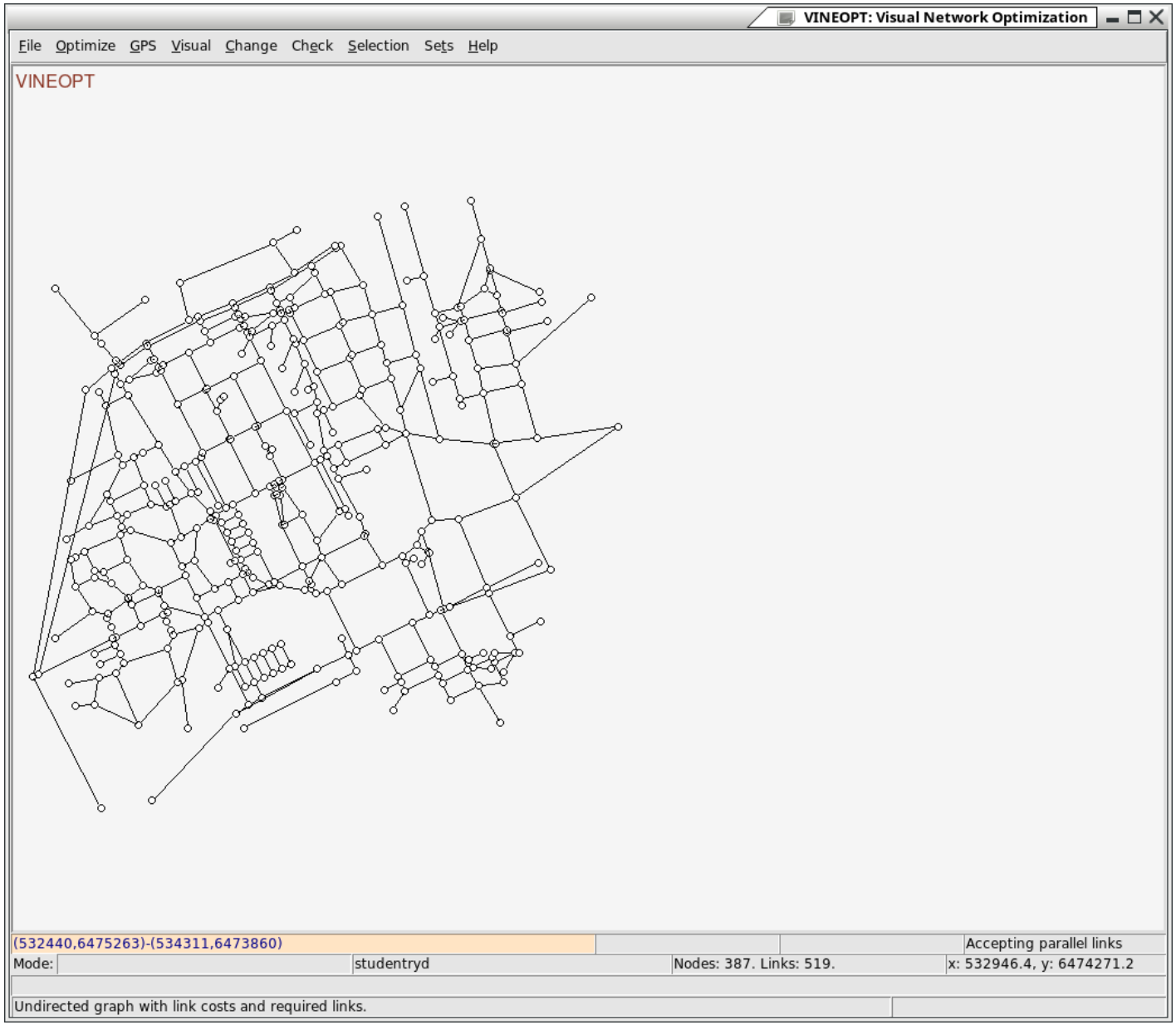
Vineopt: min cost flow



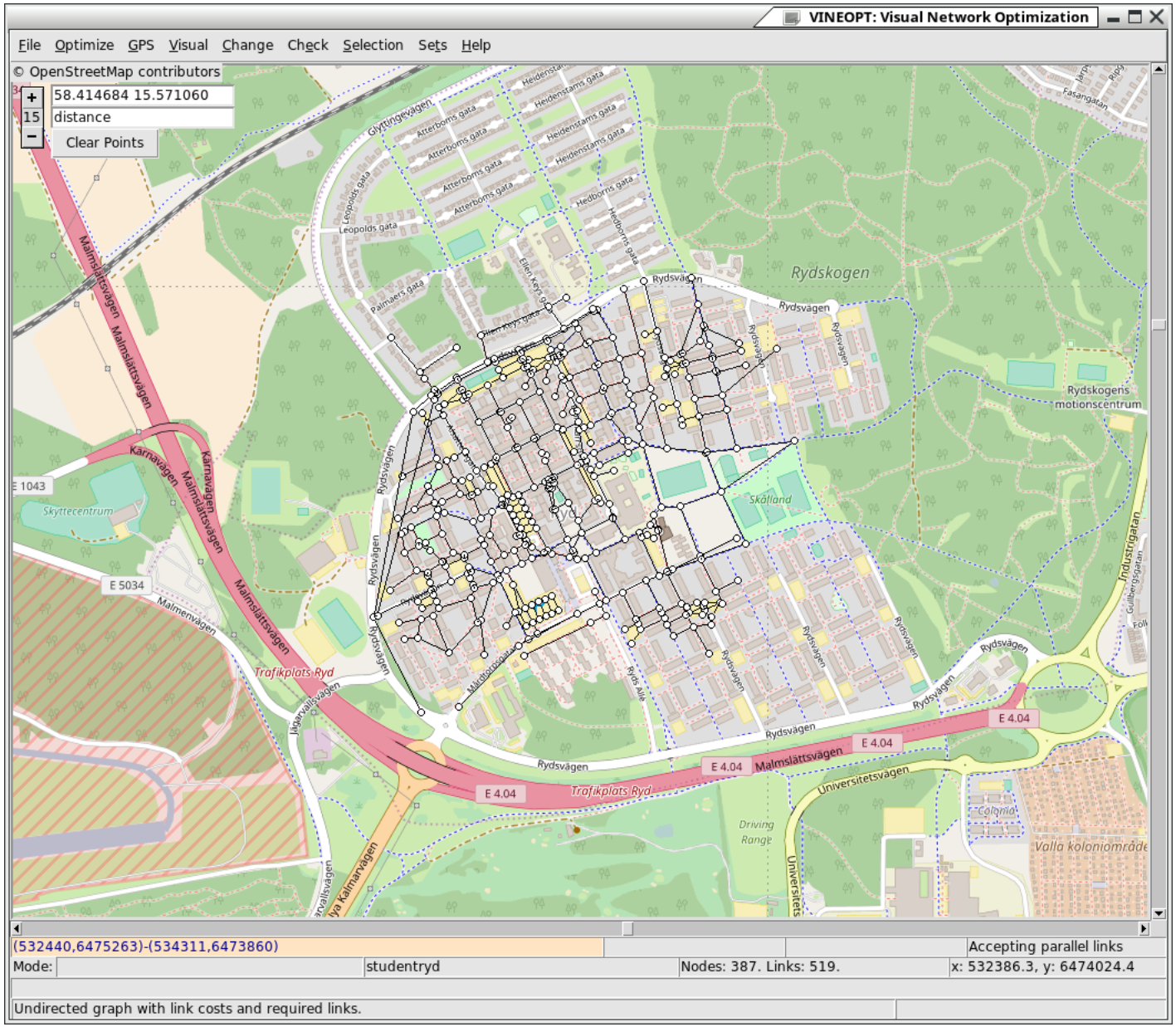
Vineopt: solution in tables



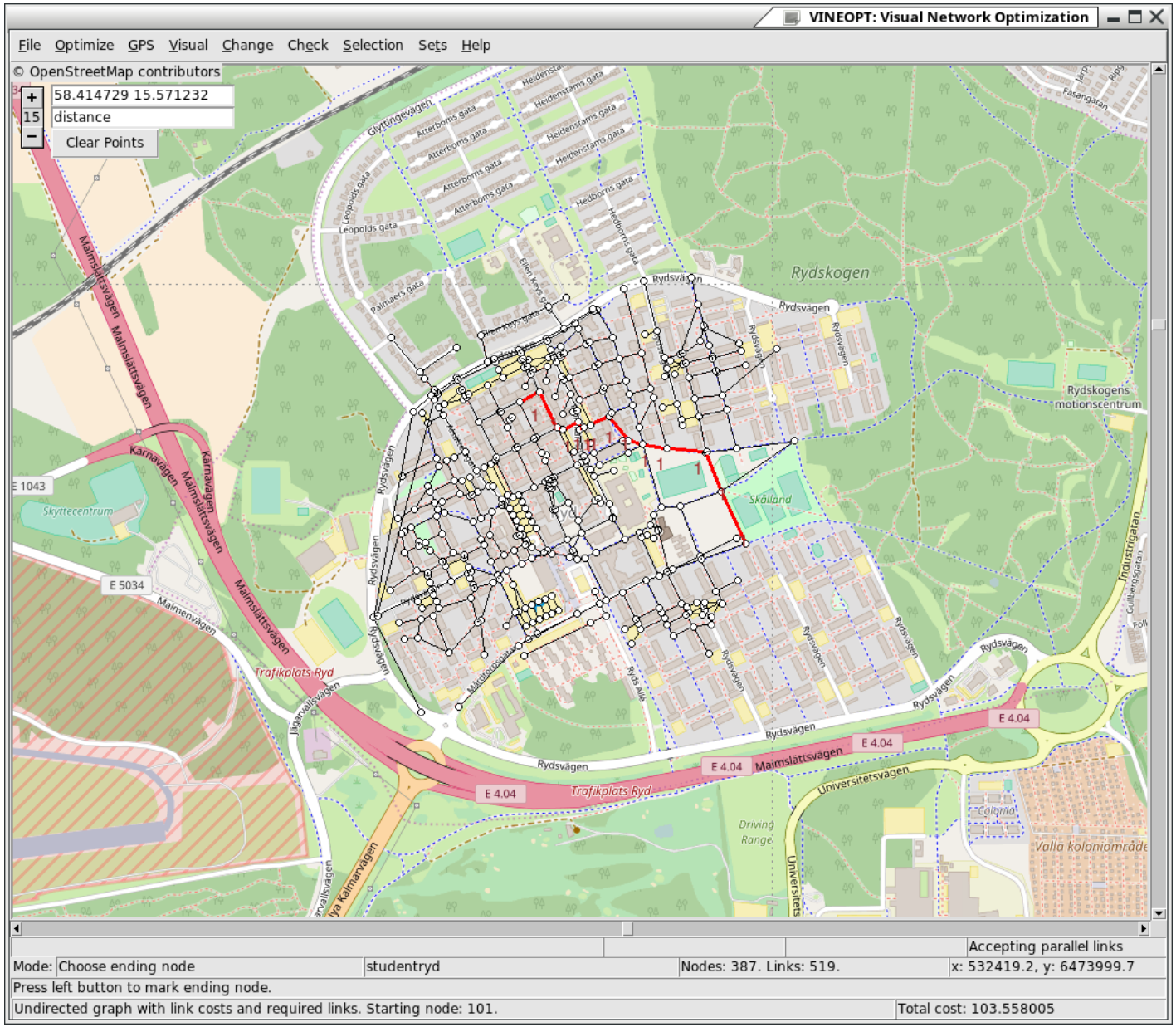
Vineopt: Ryd - student part



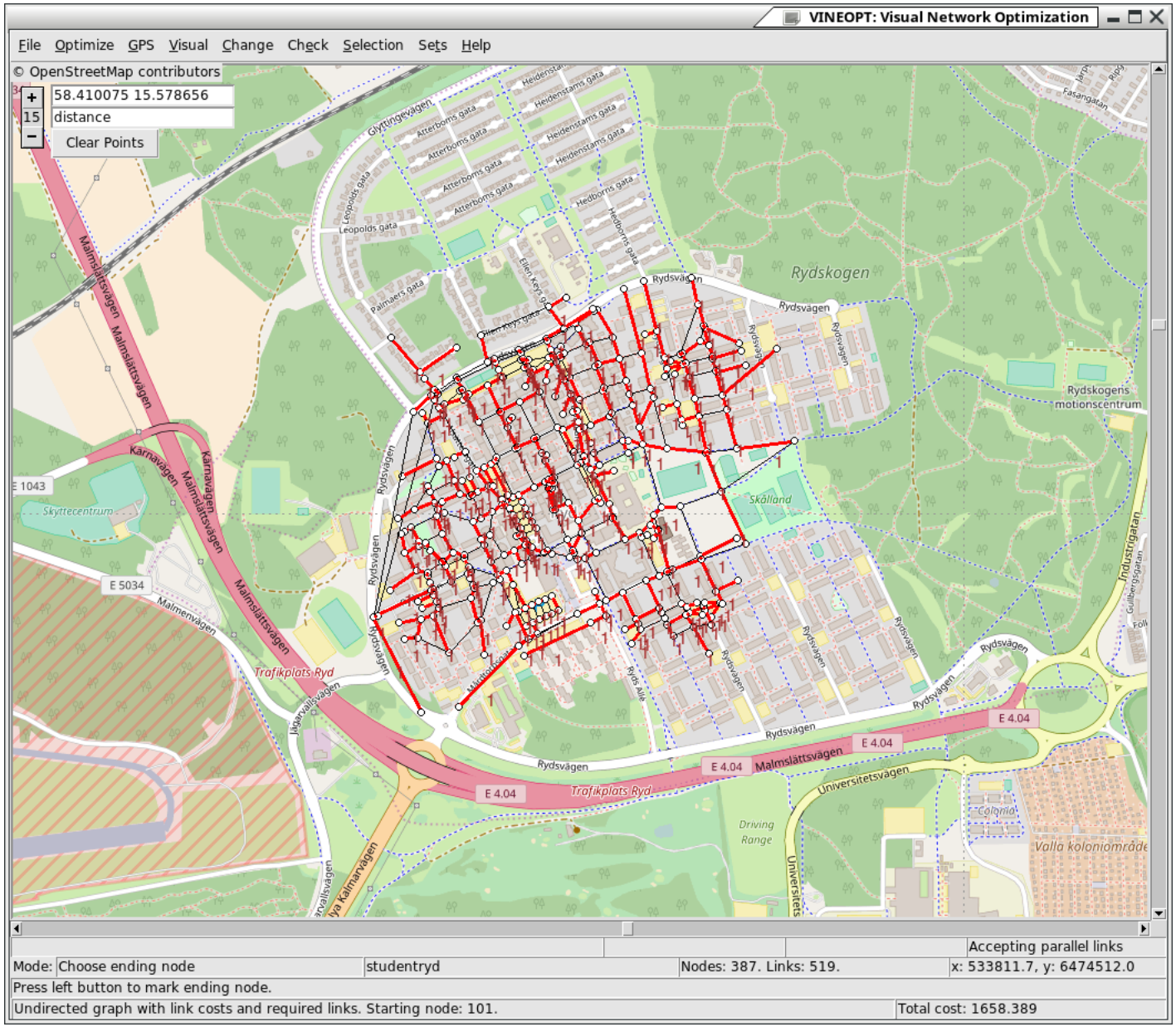
Vineopt: Ryd - student part with OSM background



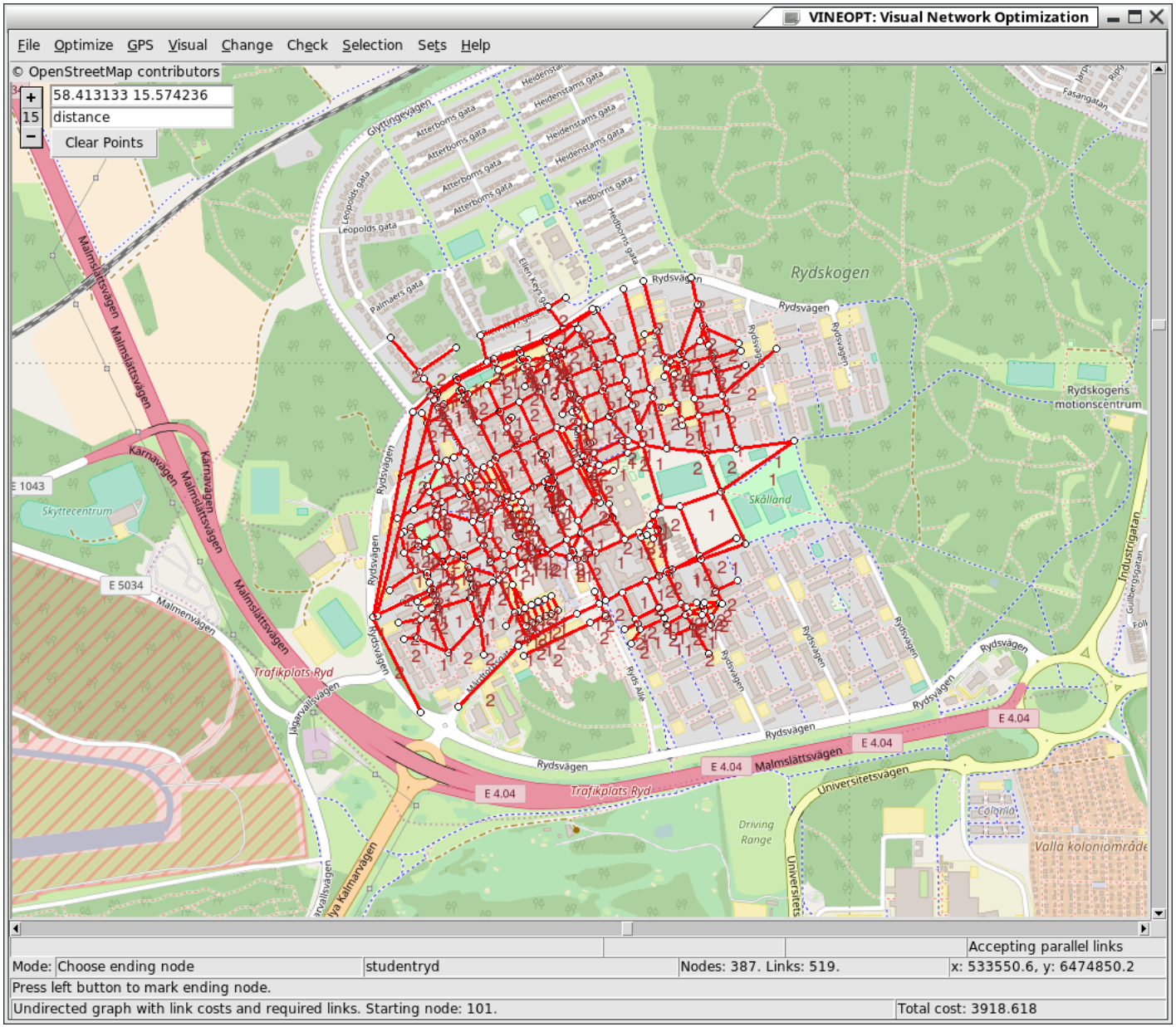
Vineopt: shortest path in Ryd



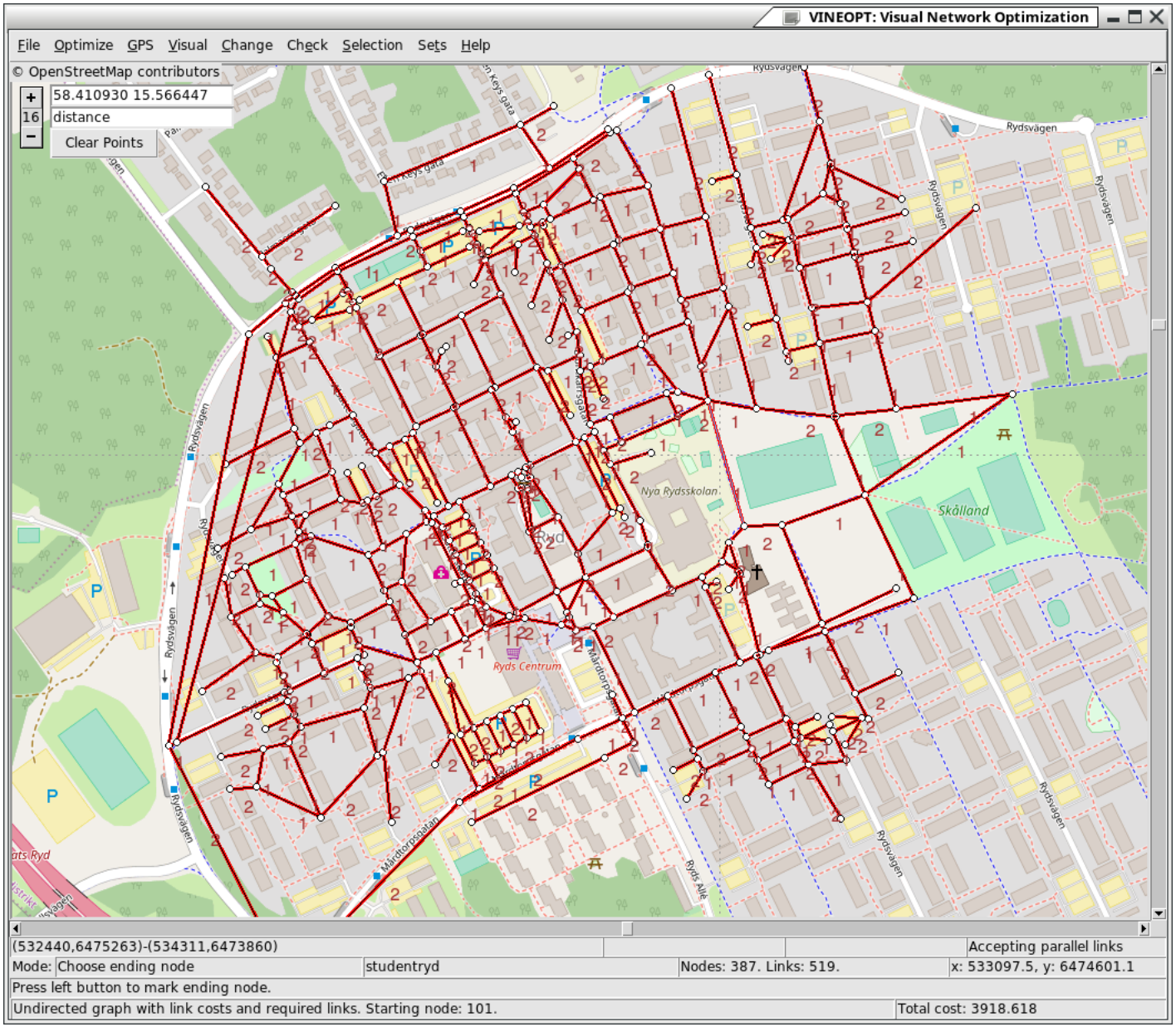
Vineopt: MST in Ryd



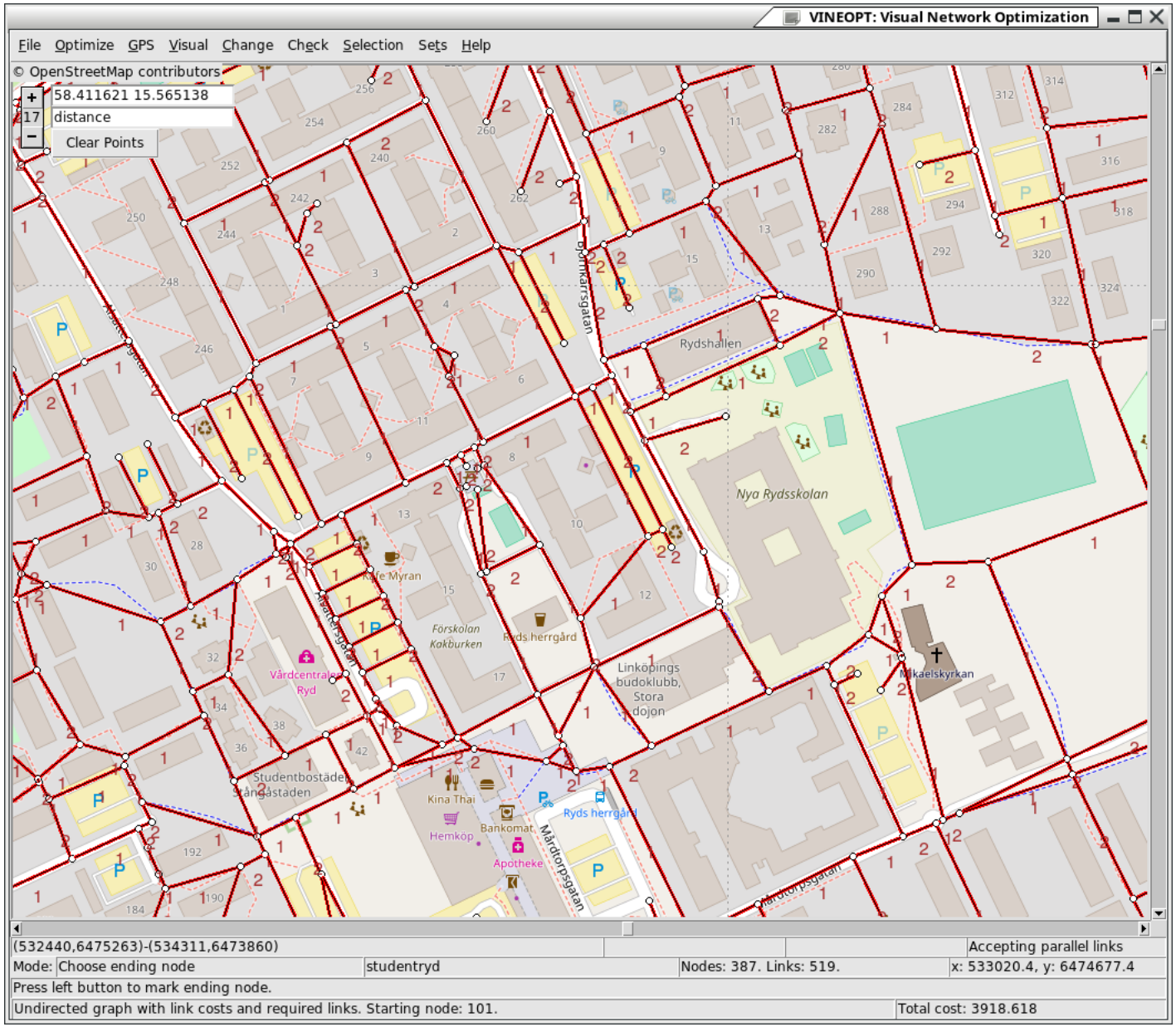
Vineopt: Chinese postman in Ryd



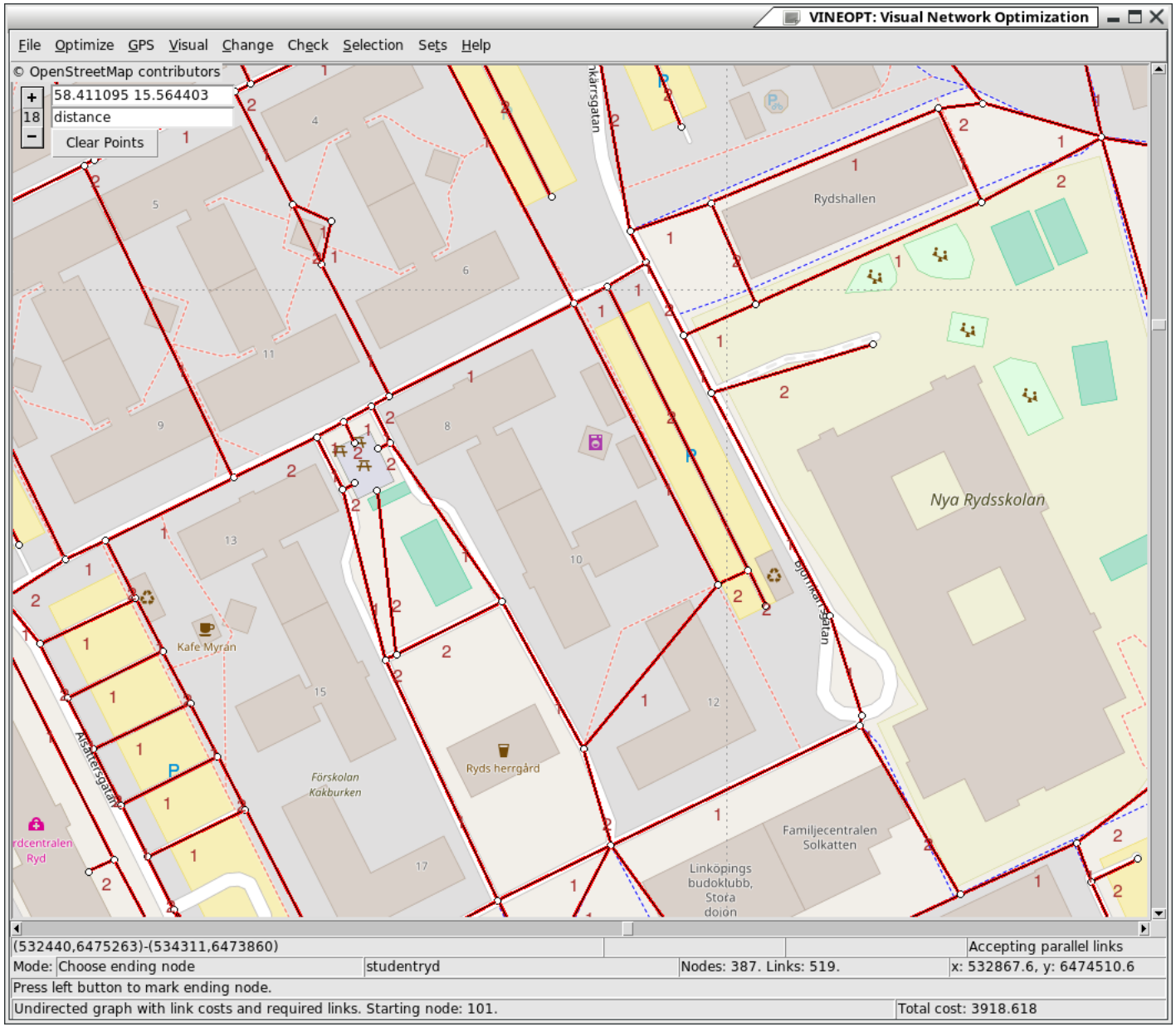
Vineopt: Chinese postman in Ryd - zoom 1



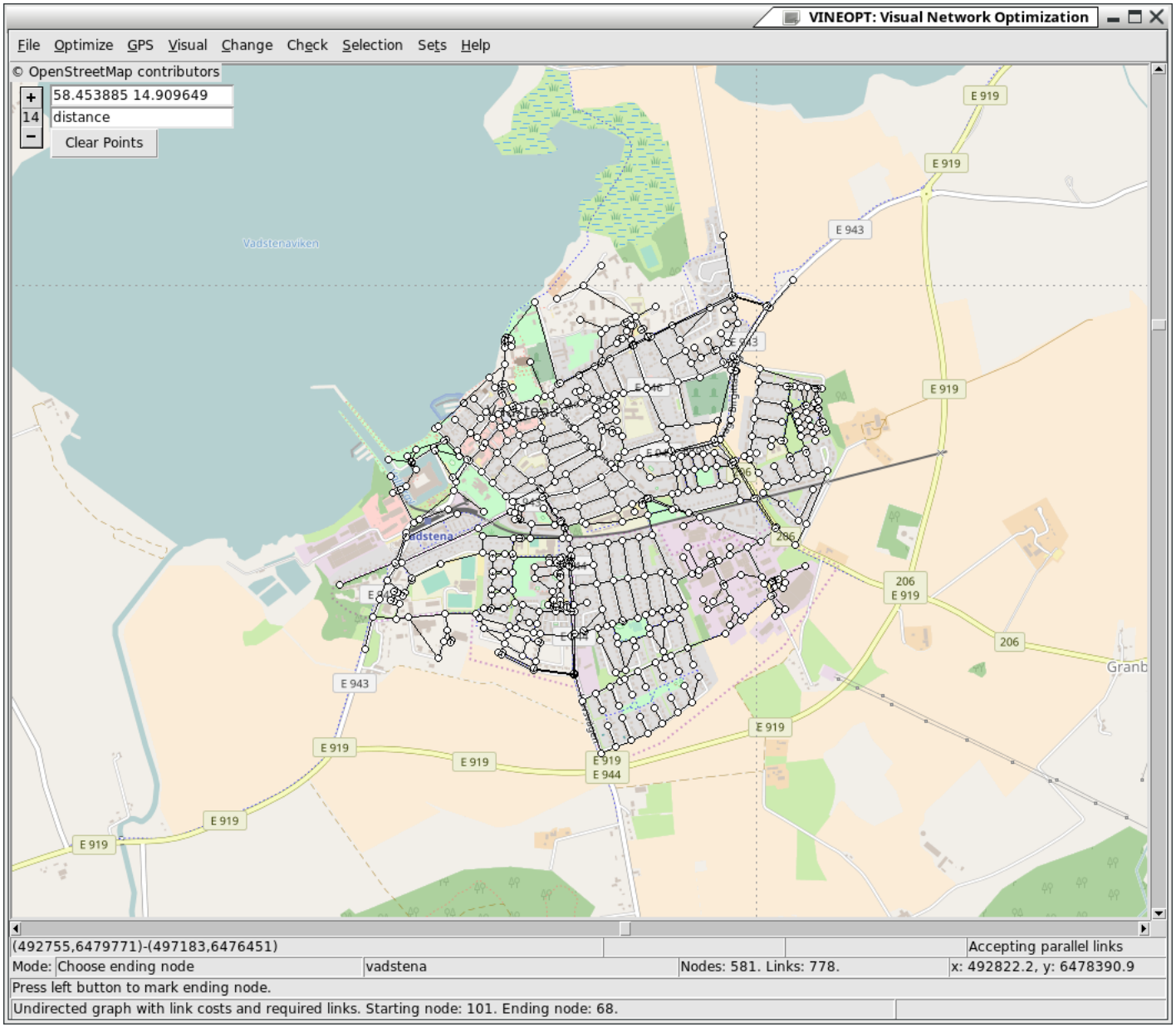
Vineopt: Chinese postman in Ryd - zoom 2



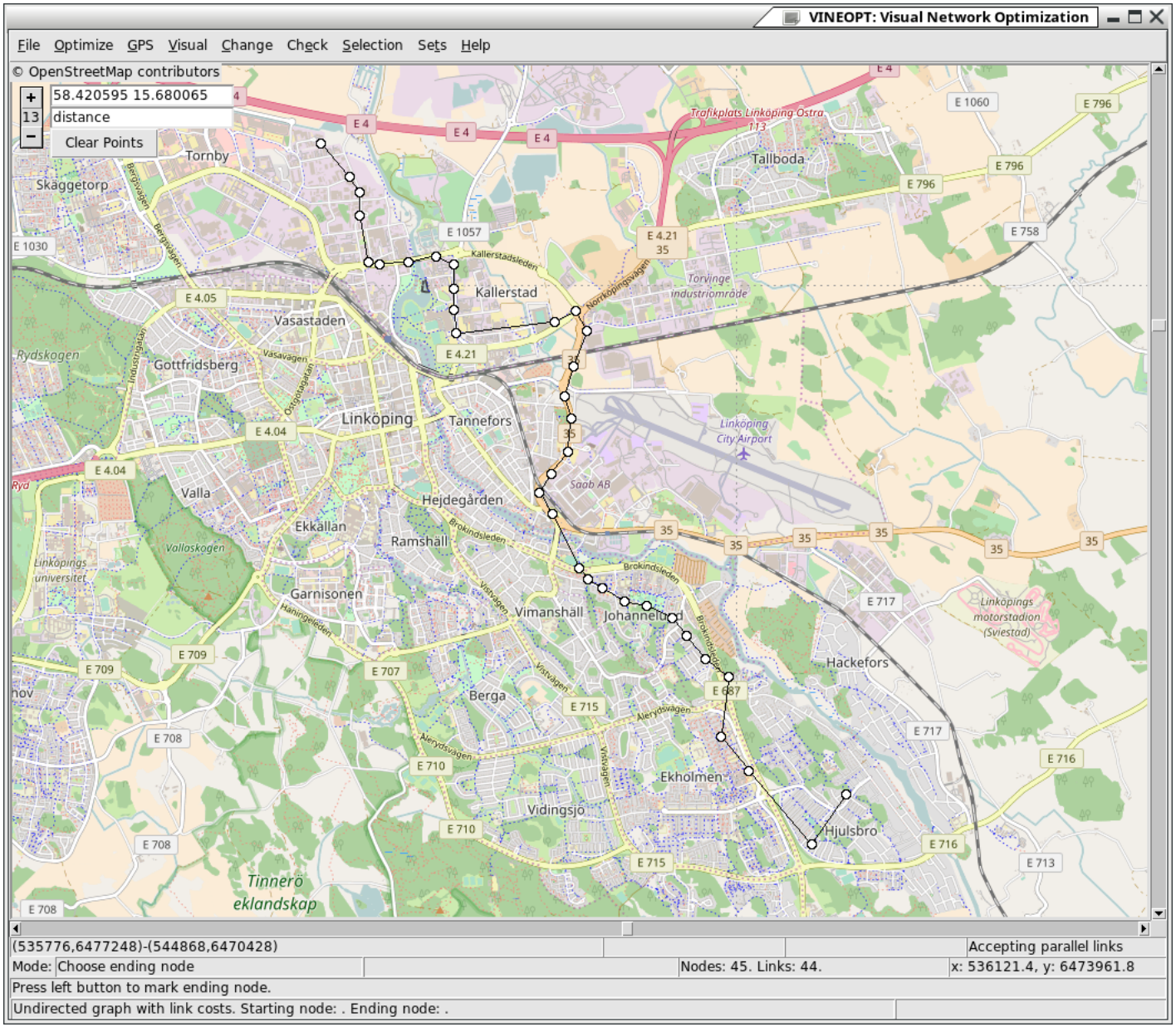
Vineopt: Chinese postman in Ryd - zoom 3



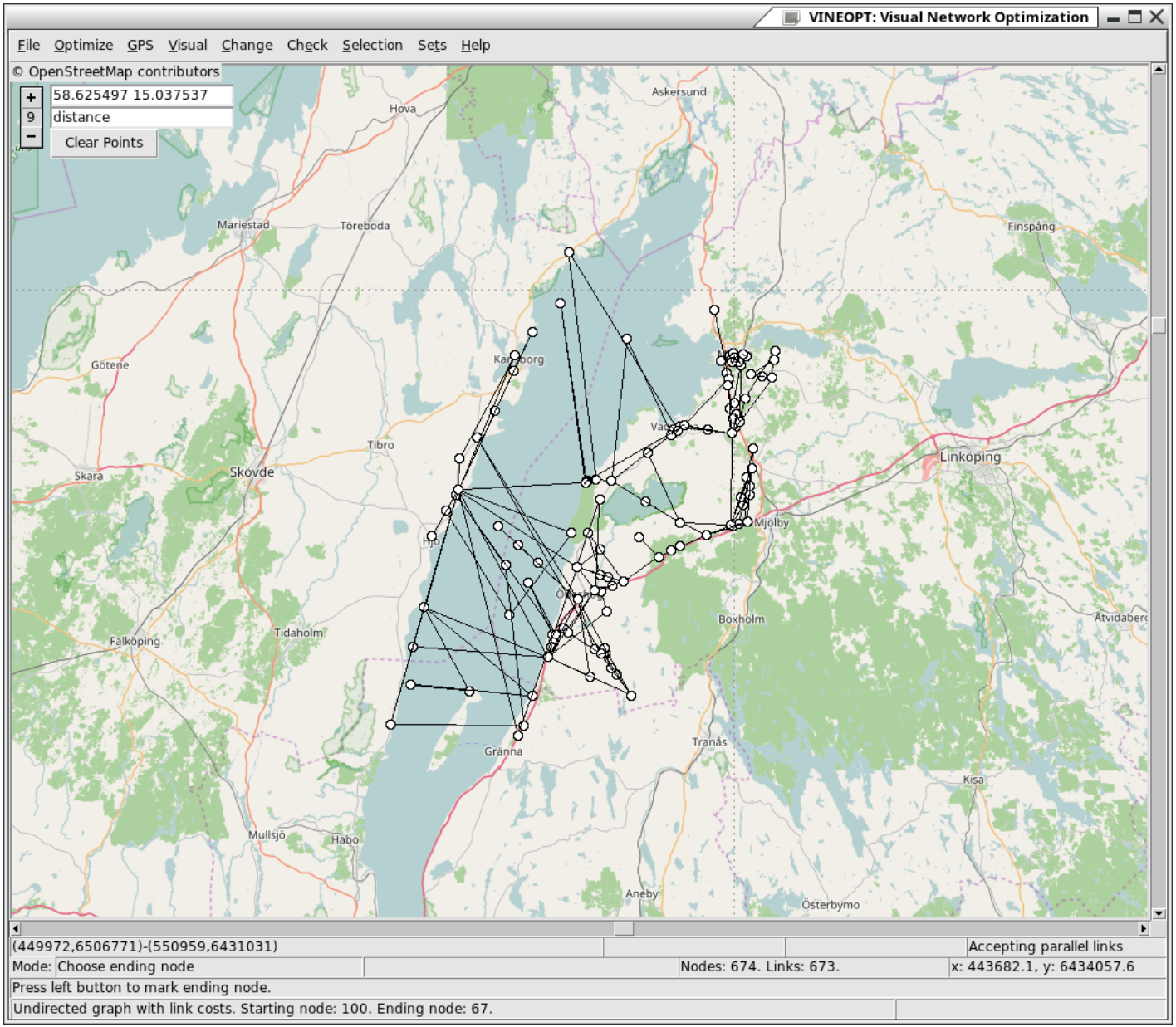
Vineopt: Vadstena



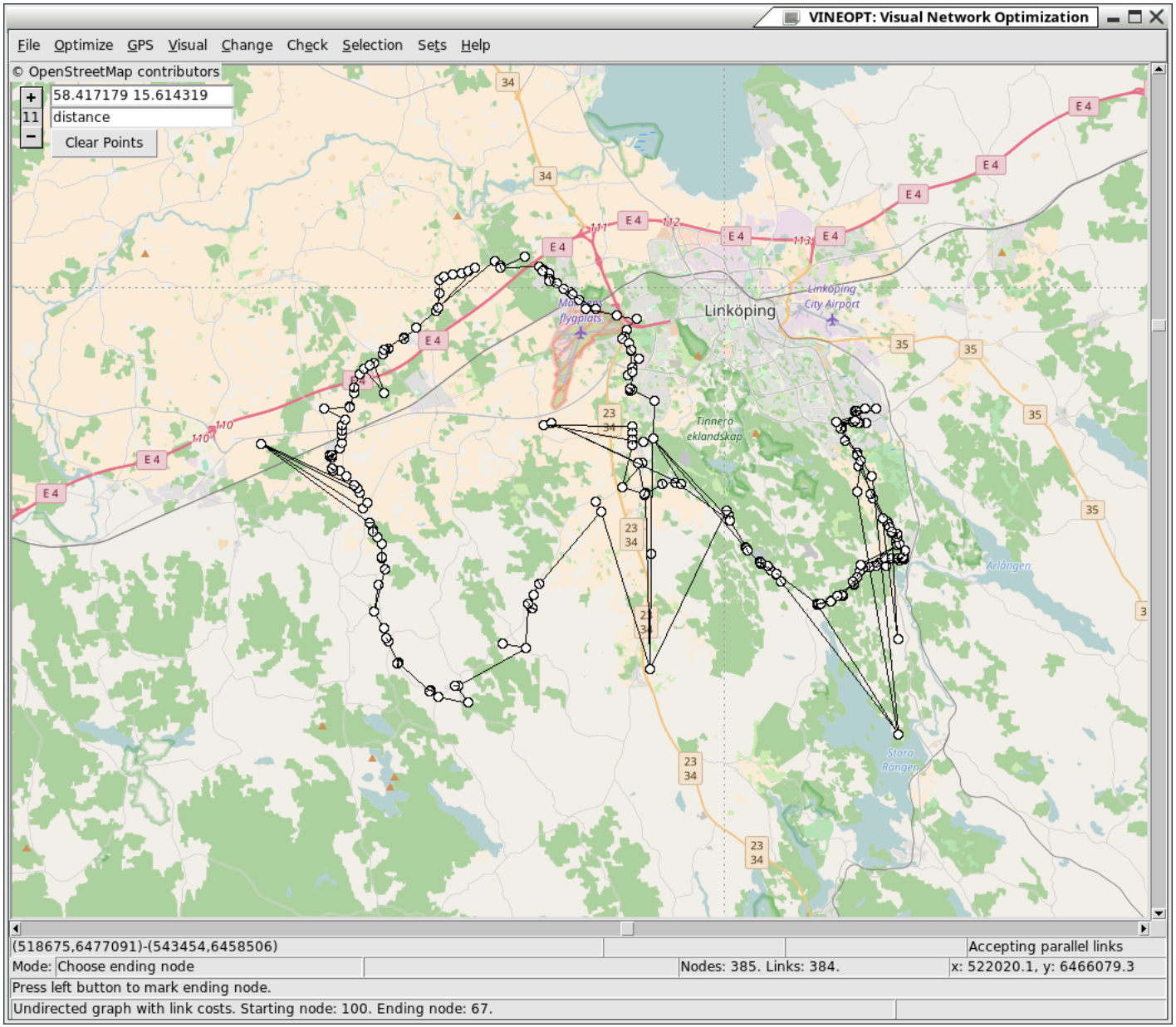
Vineopt: GPS-track: home - Tornby



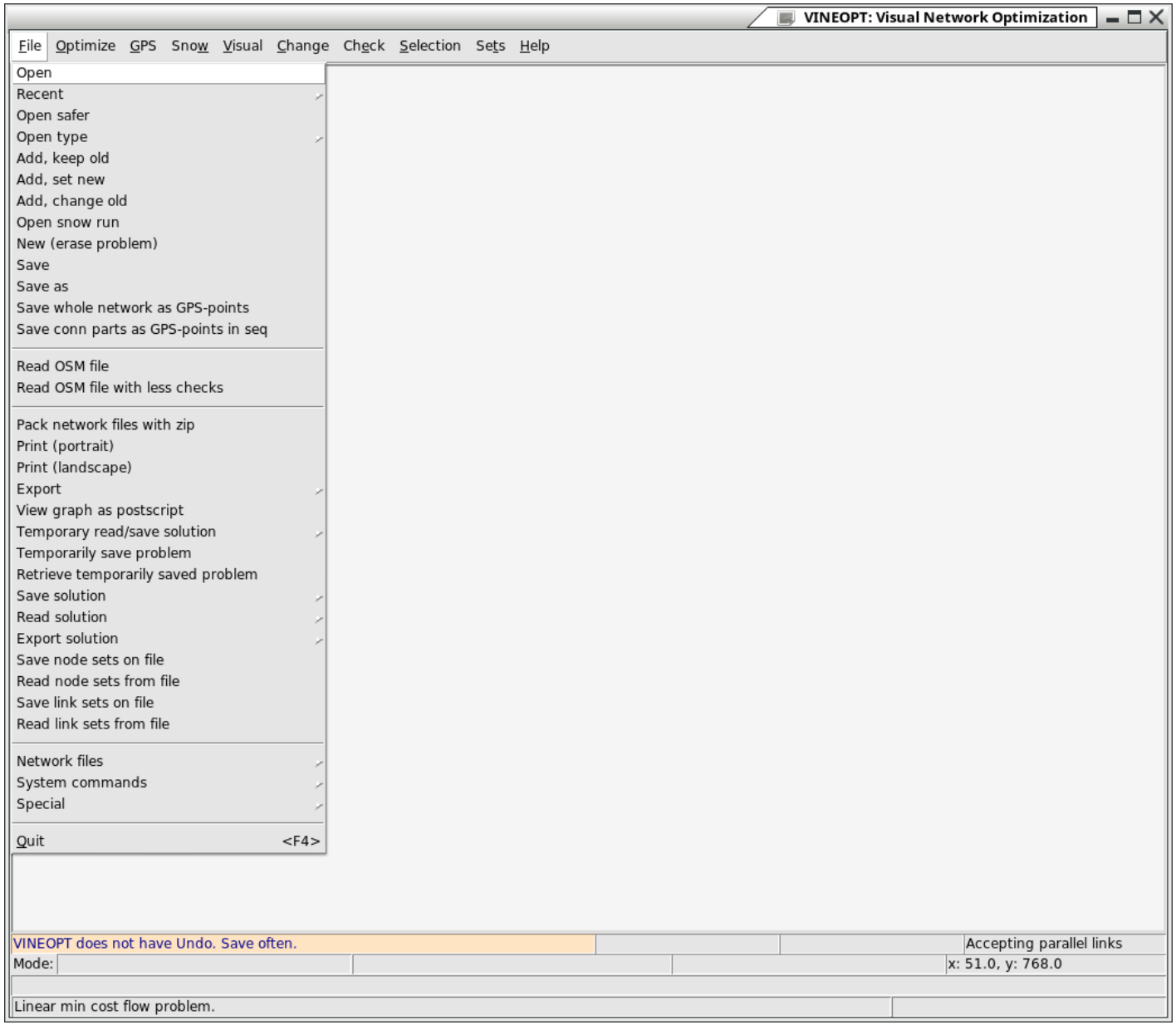
Vineopt: bad GPS-track: Halvvättern



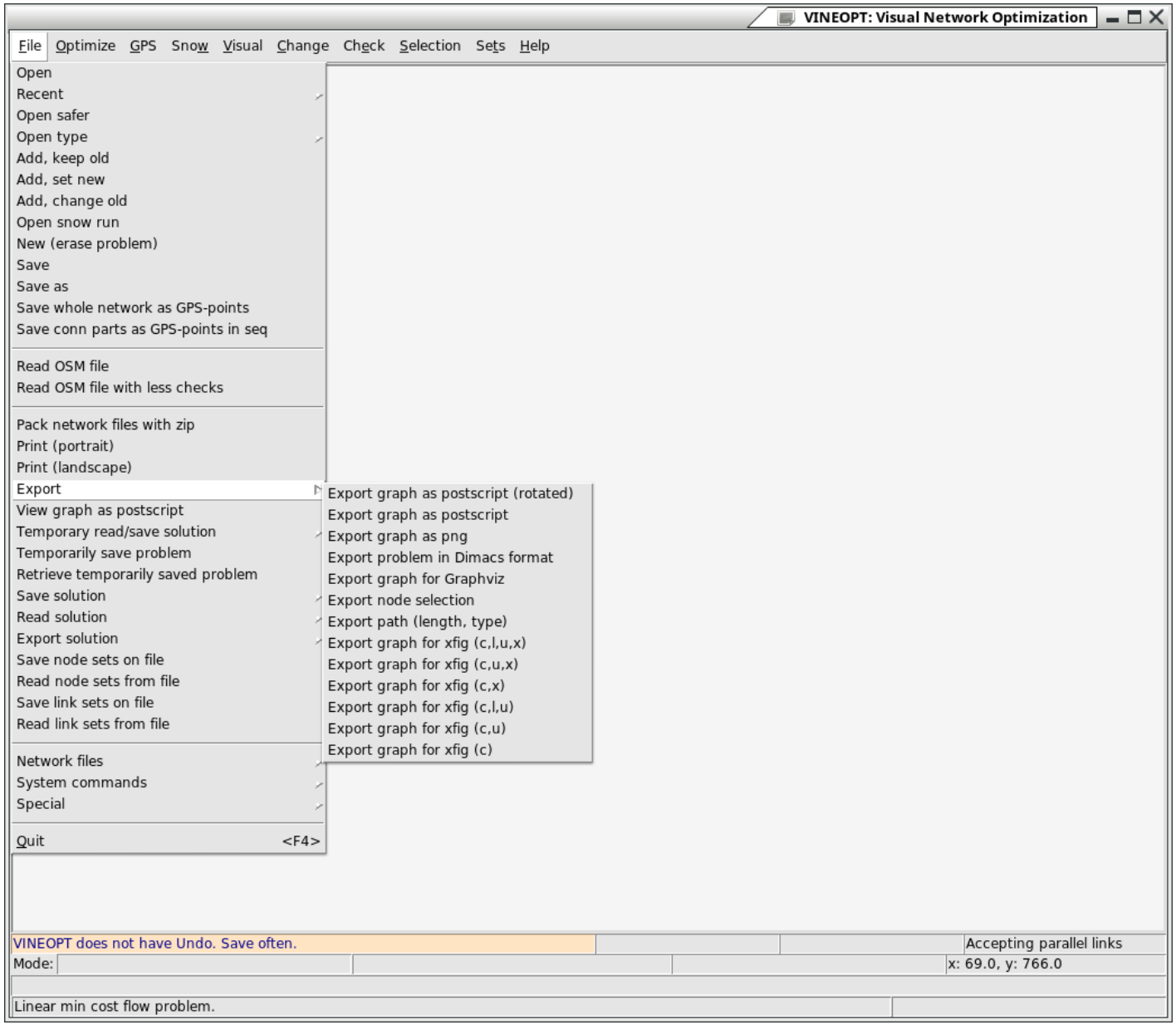
Vineopt: GPS-track with few errors: round trip



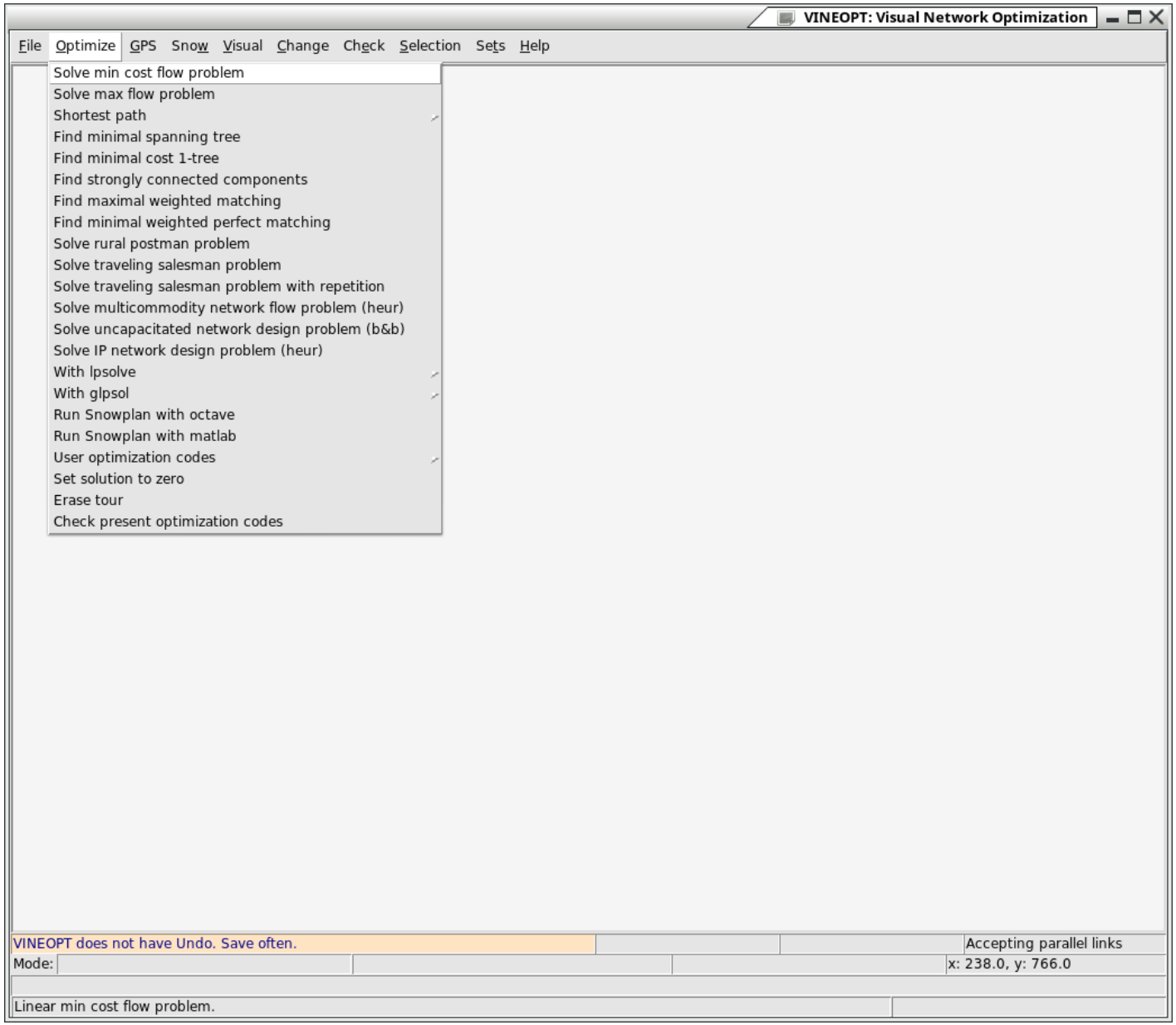
Vineopt menu 1



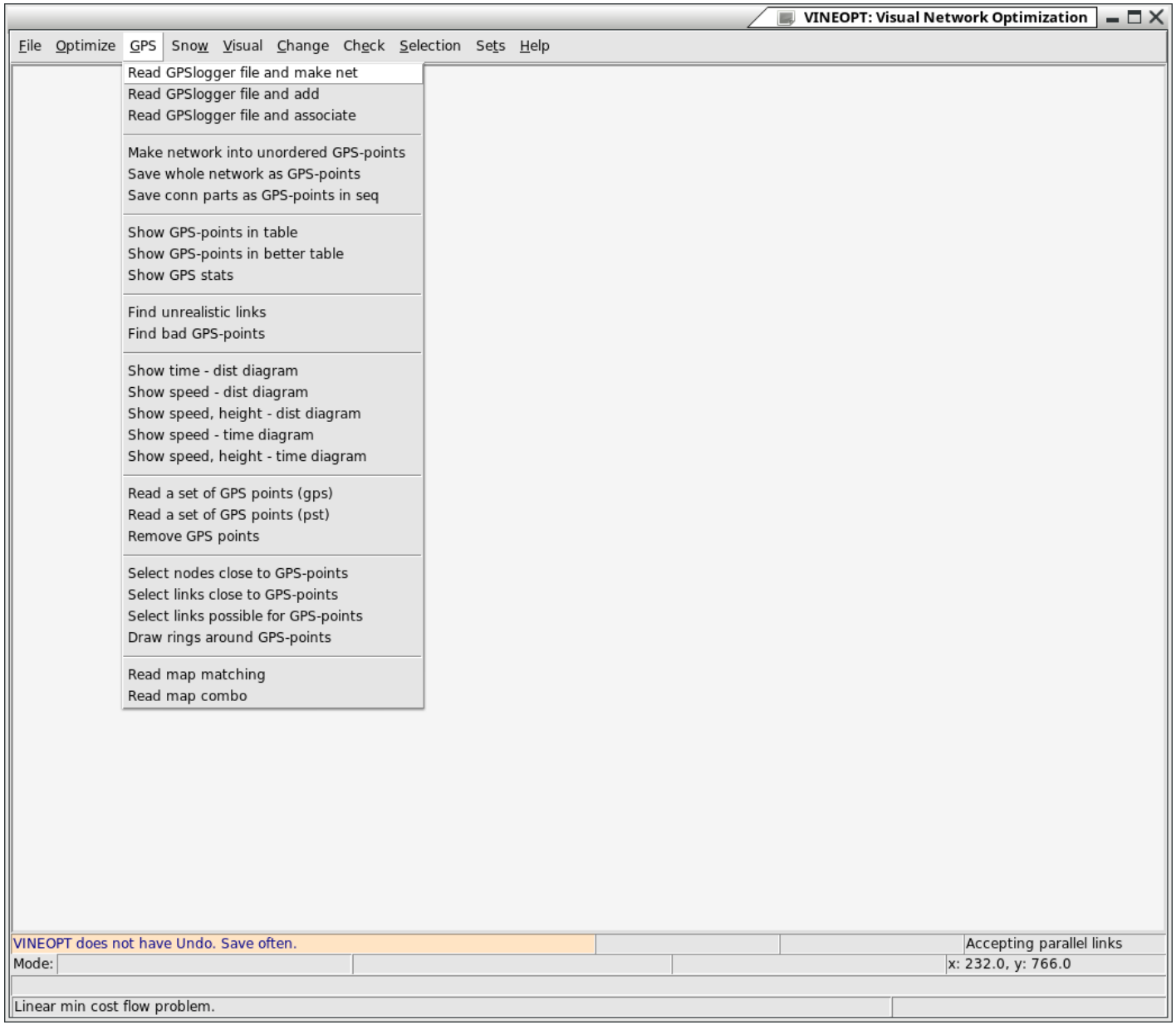
Vineopt menu 1b



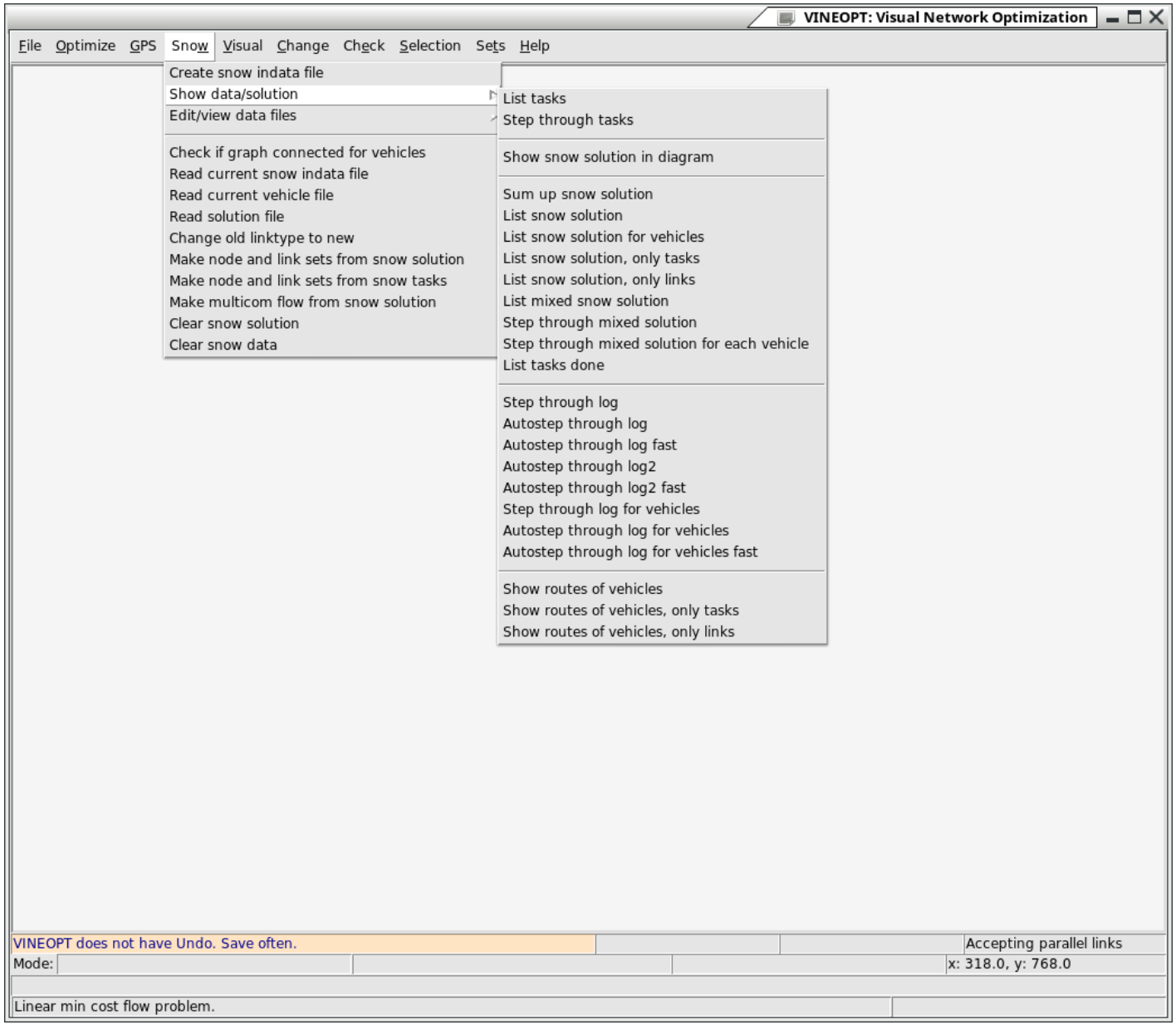
Vineopt menu 2



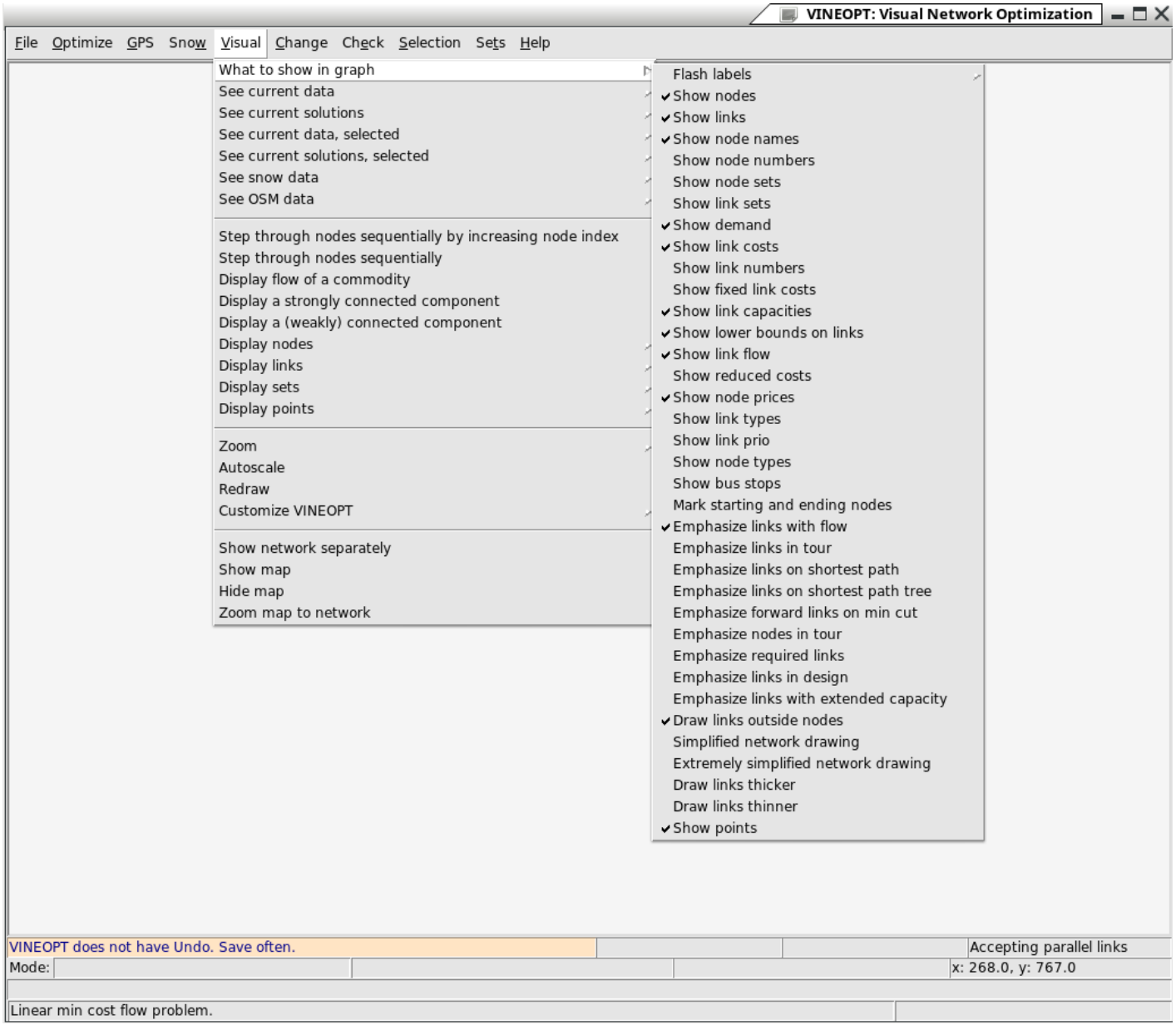
Vineopt menu 3



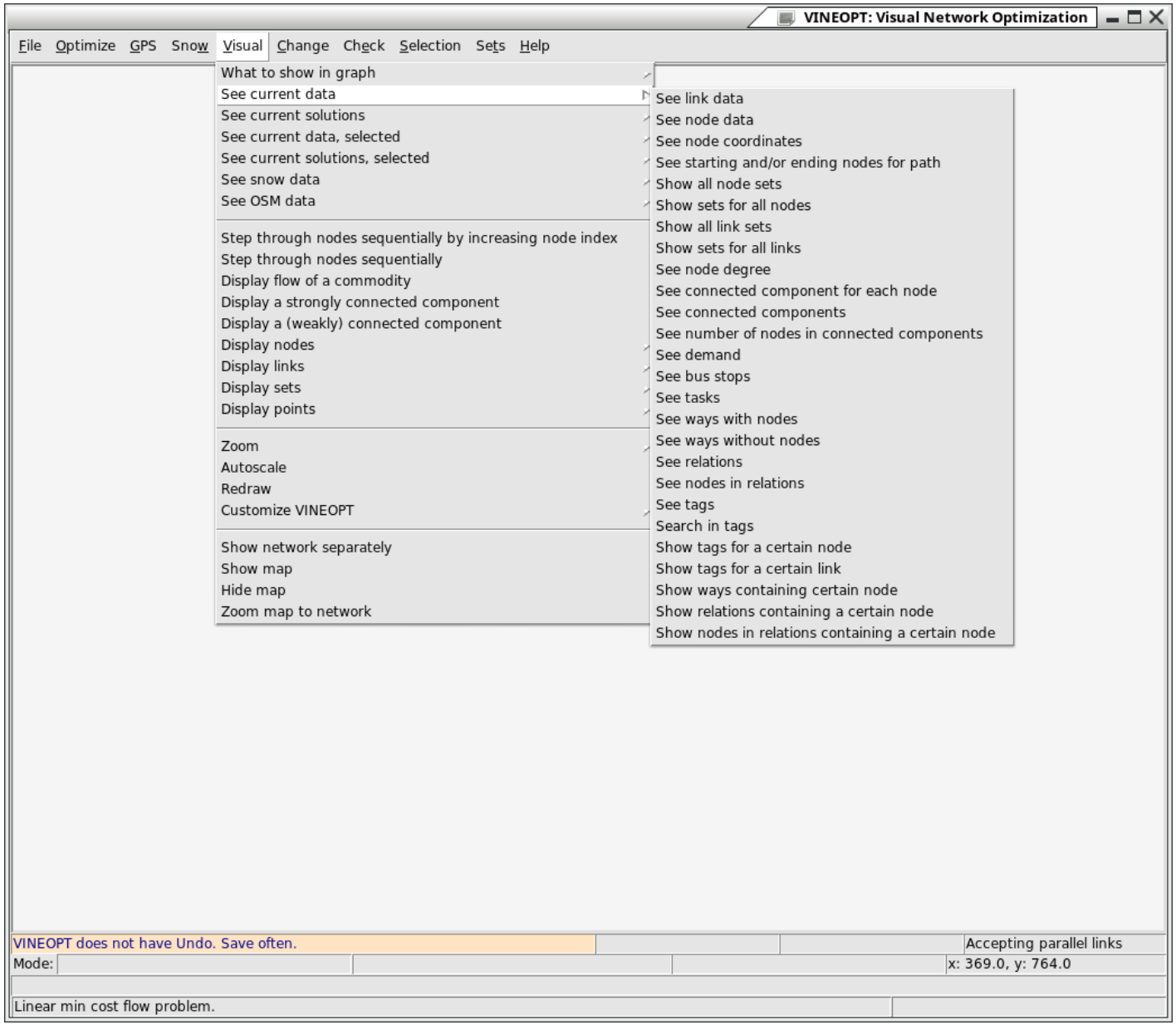
Vineopt menu 4



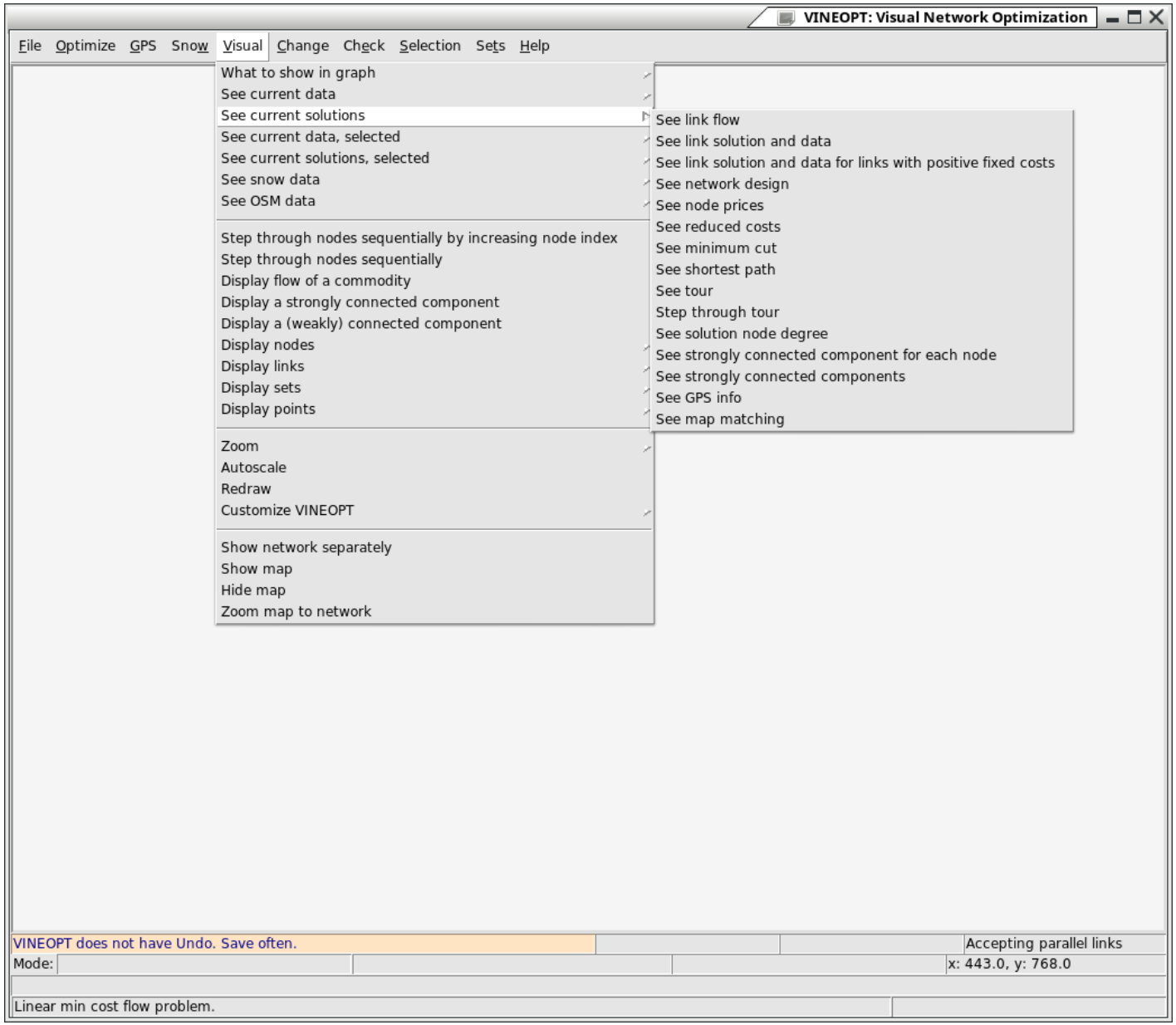
Vineopt menu 5a



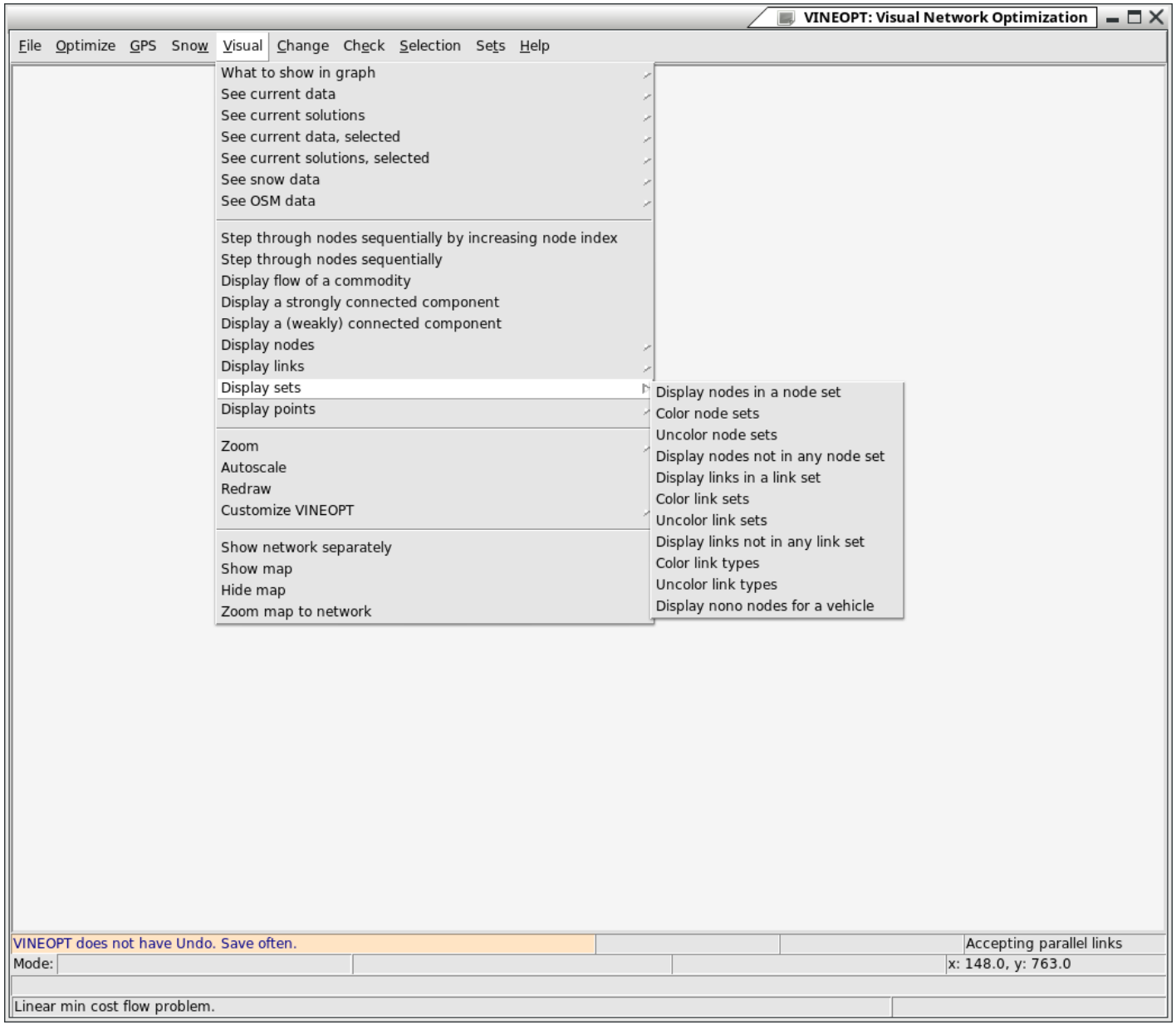
Vineopt menu 5b



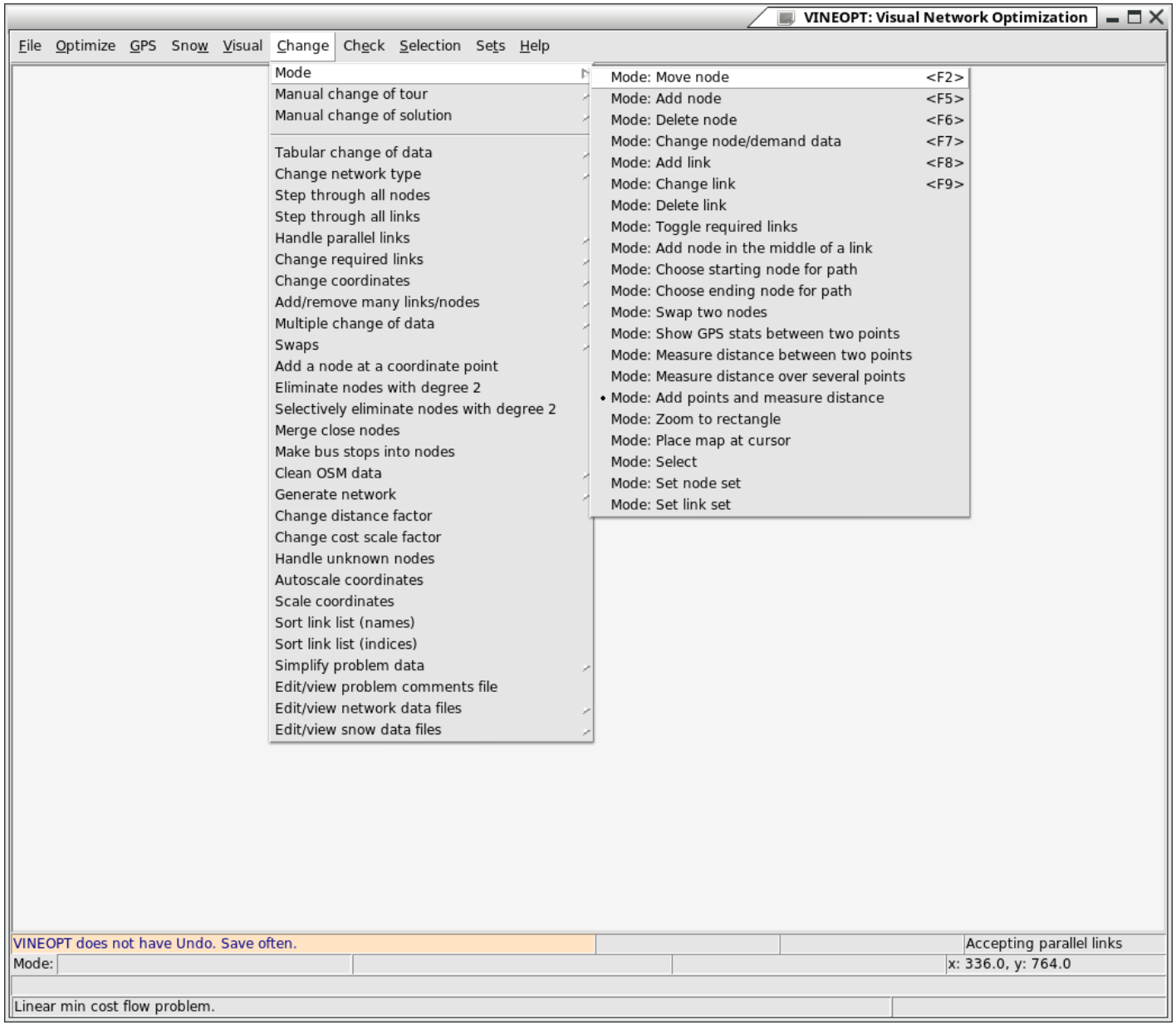
Vineopt menu 5c



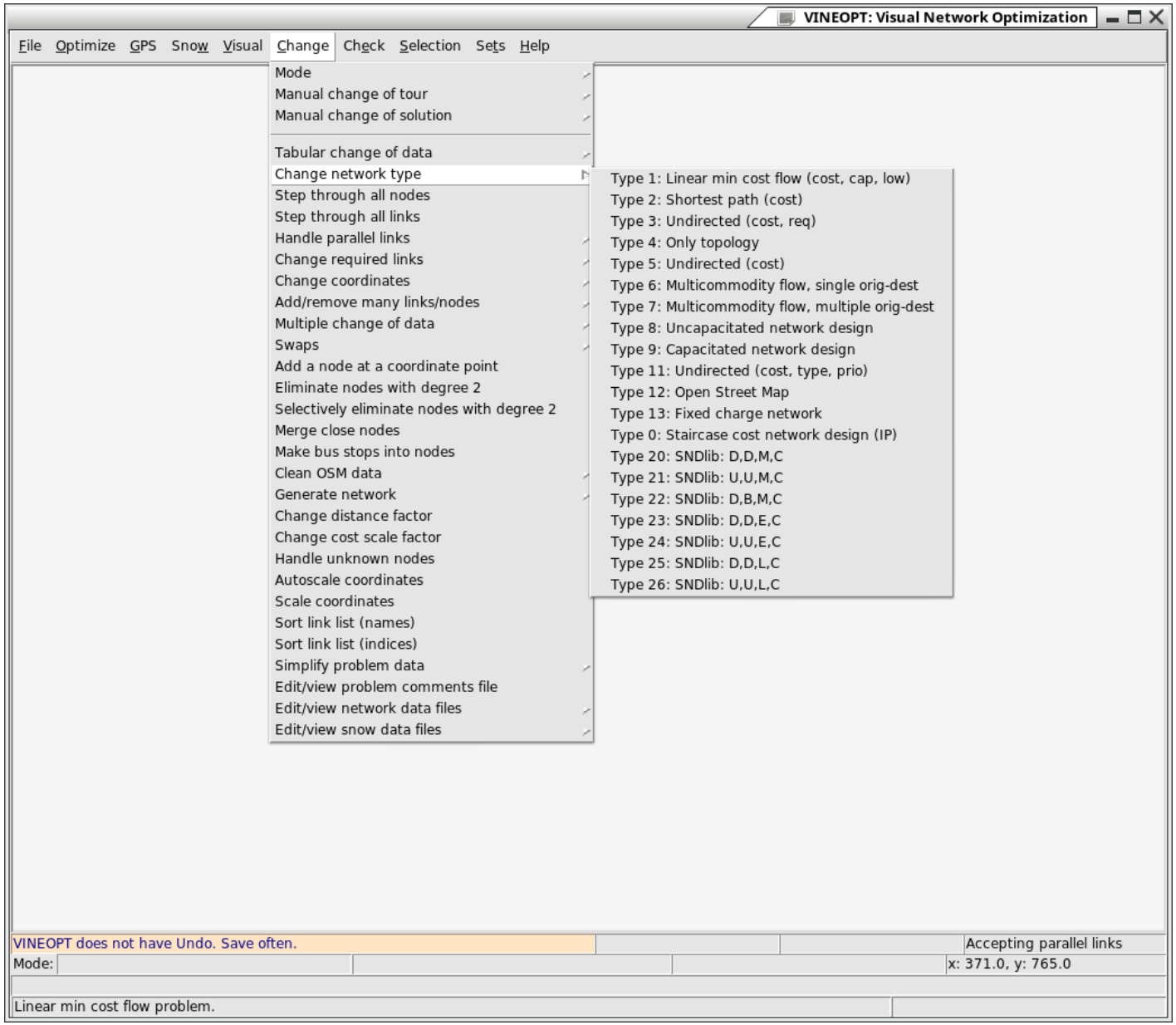
Vineopt menu 5d



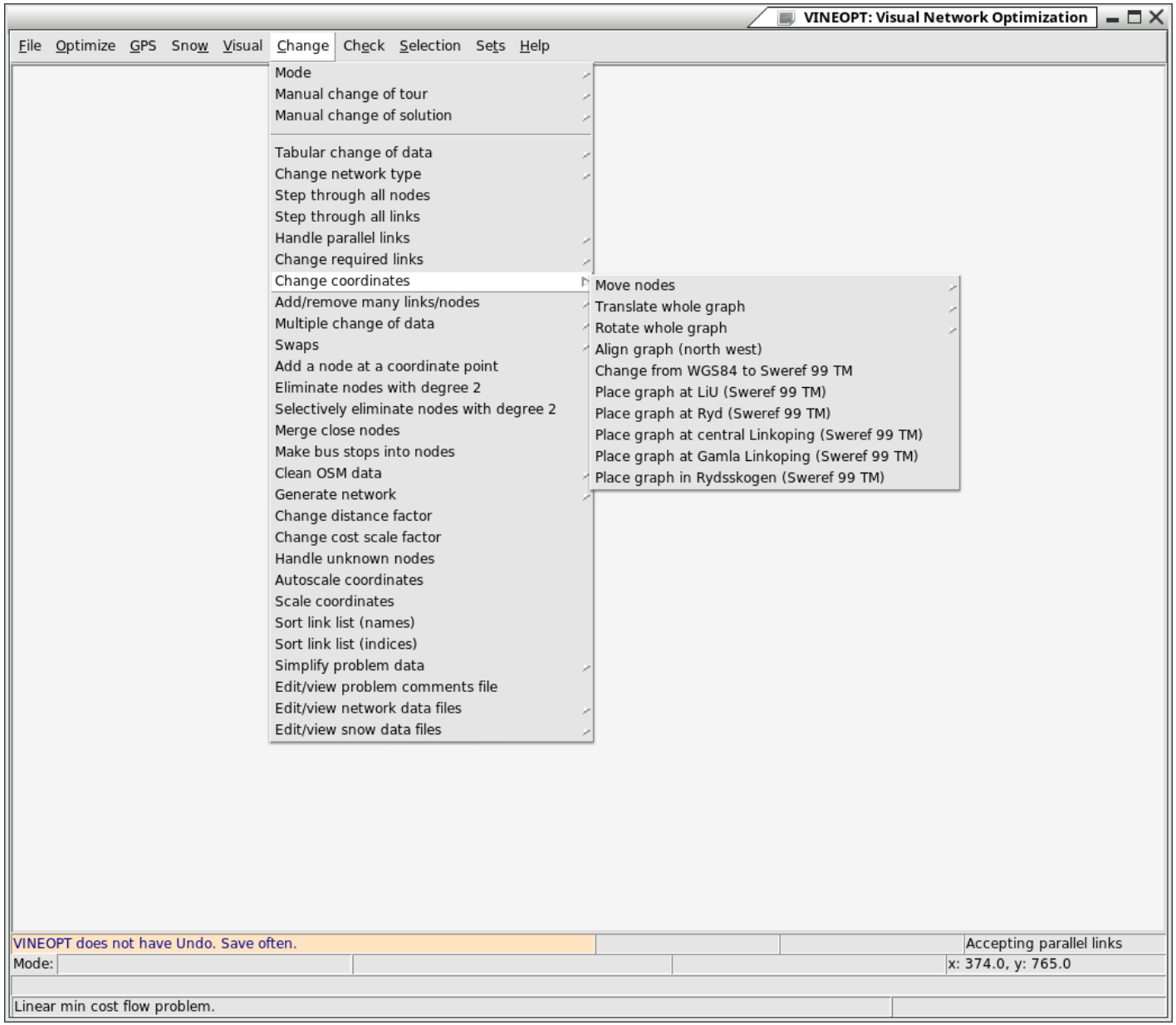
Vineopt menu 6a



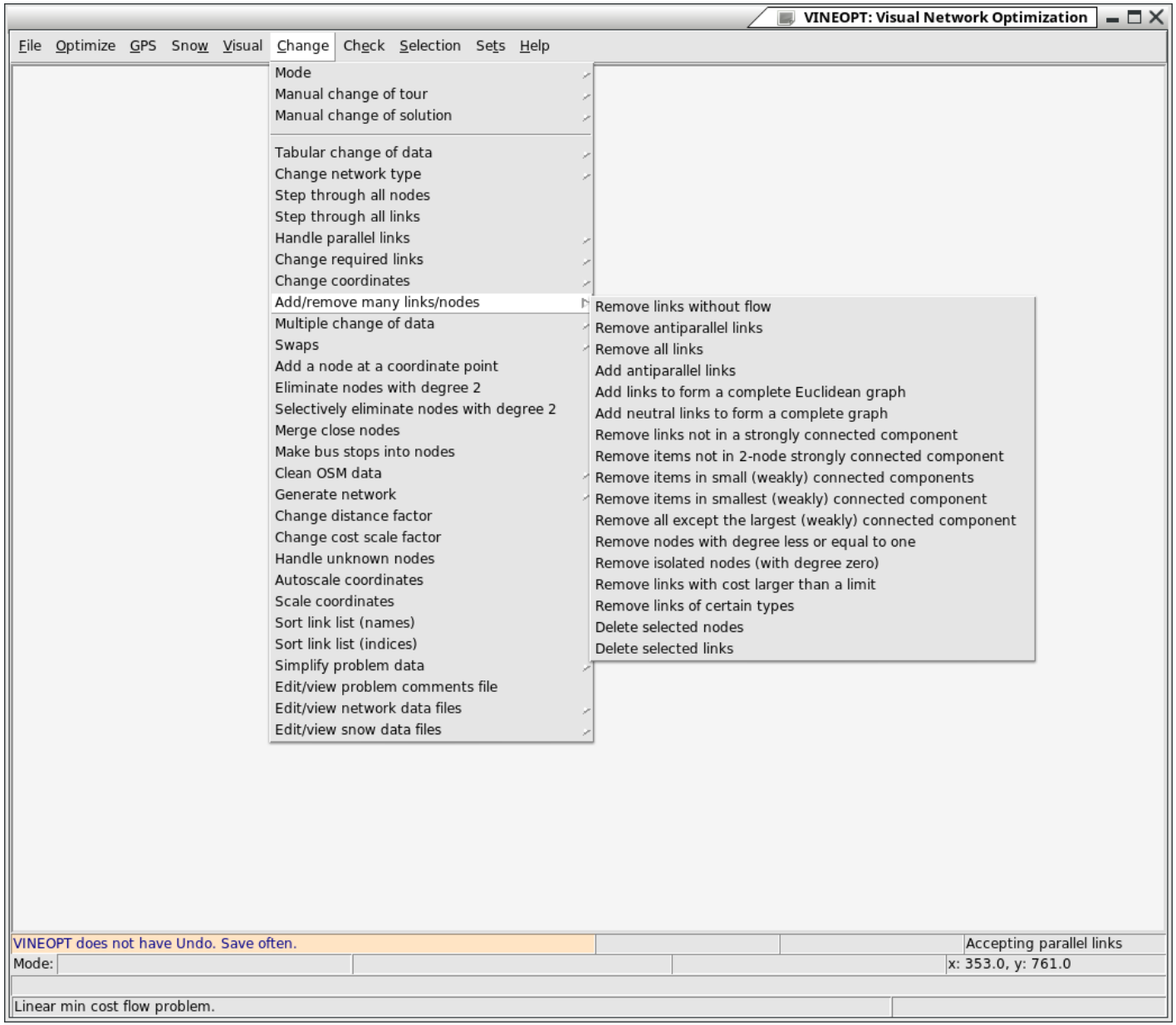
Vineopt menu 6b



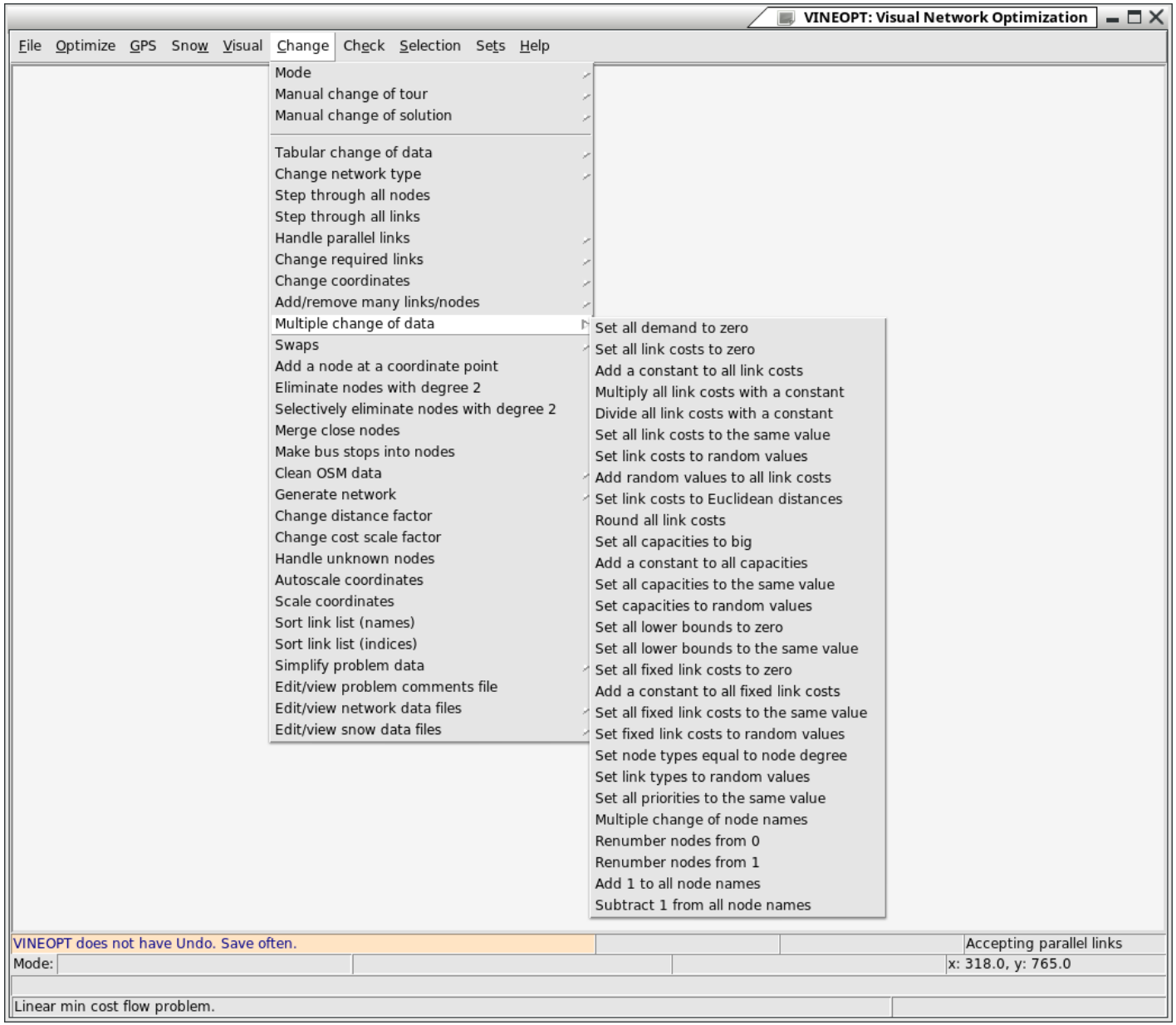
Vineopt menu 6c



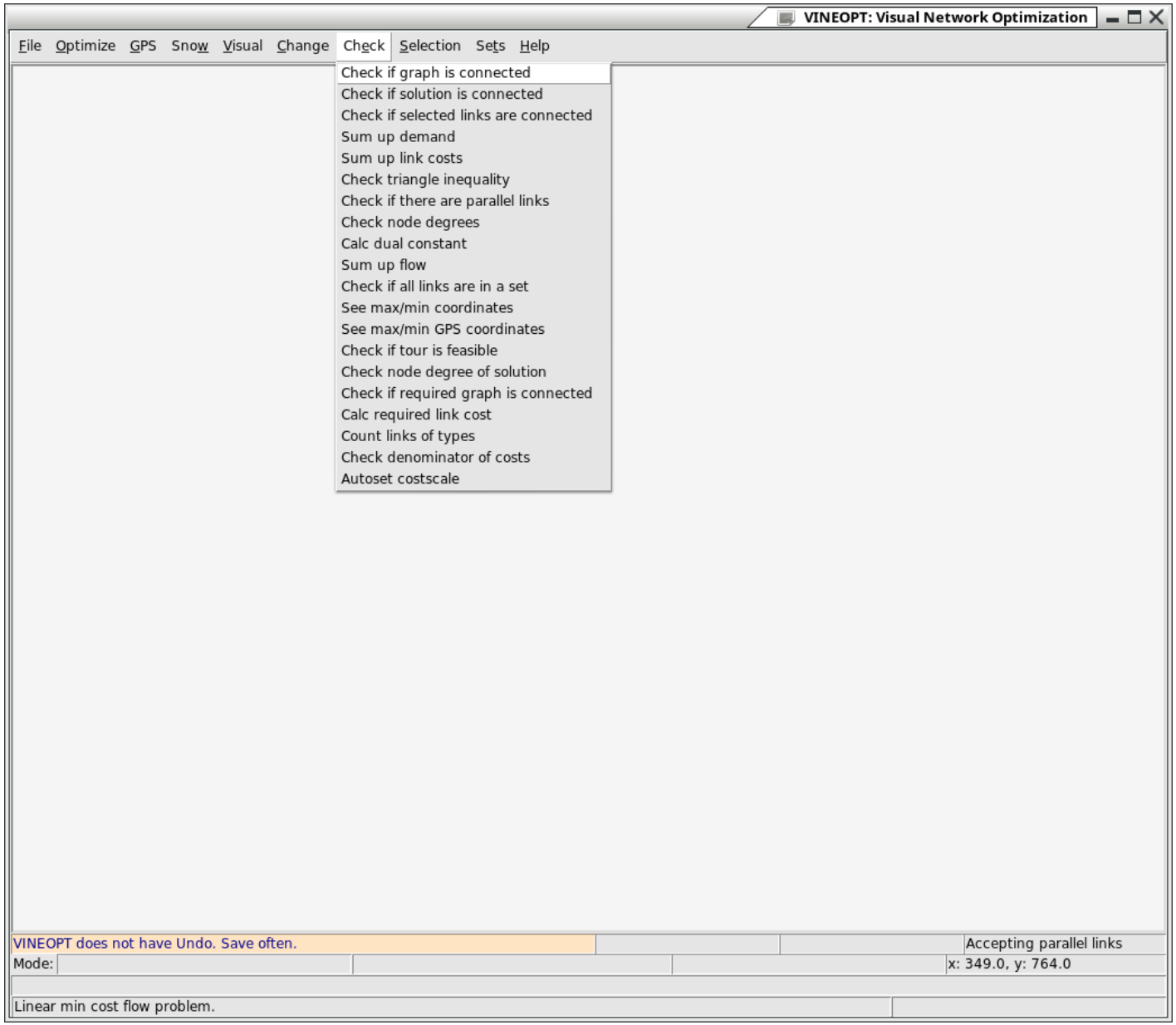
Vineopt menu 6d



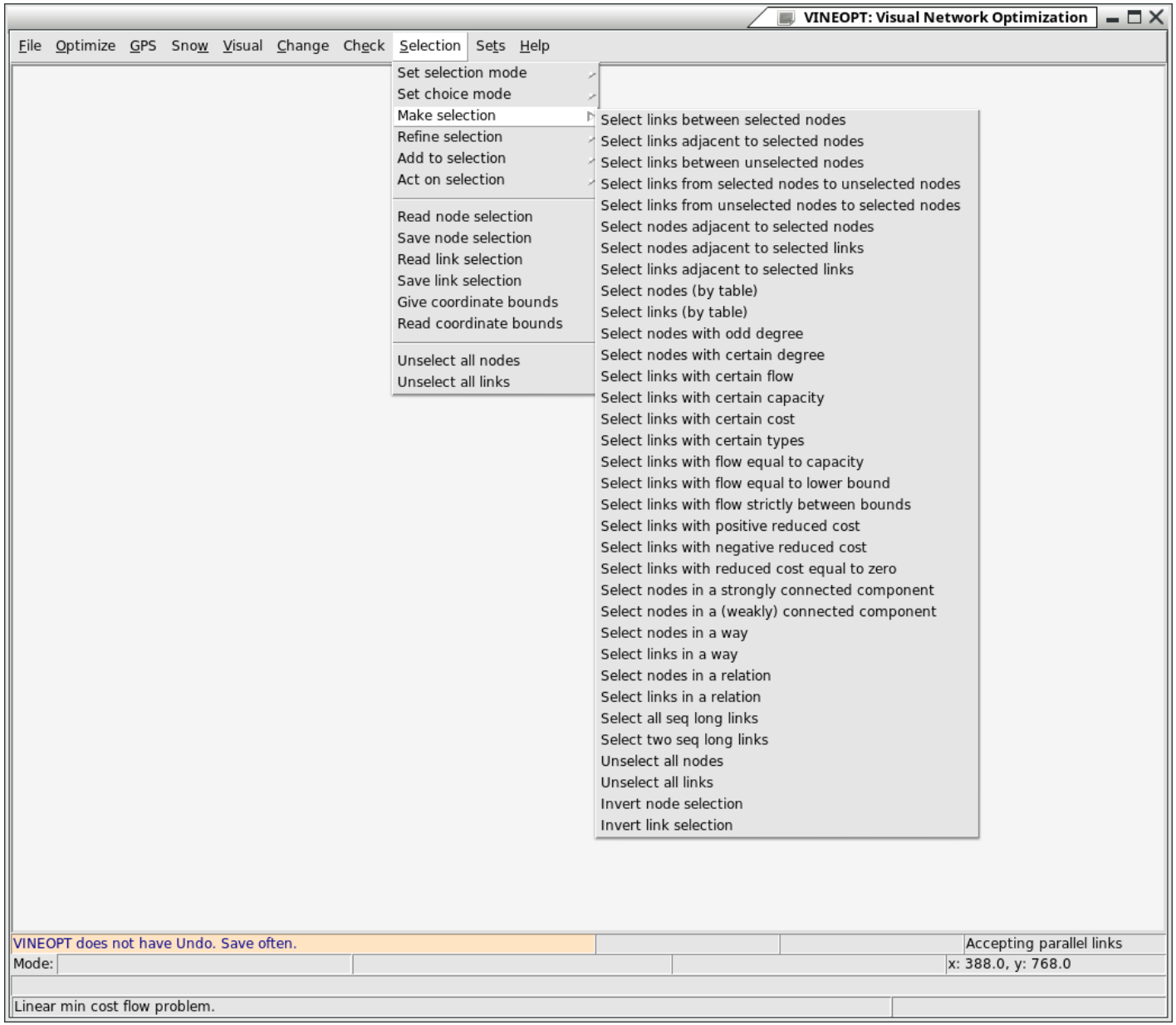
Vineopt menu 6e



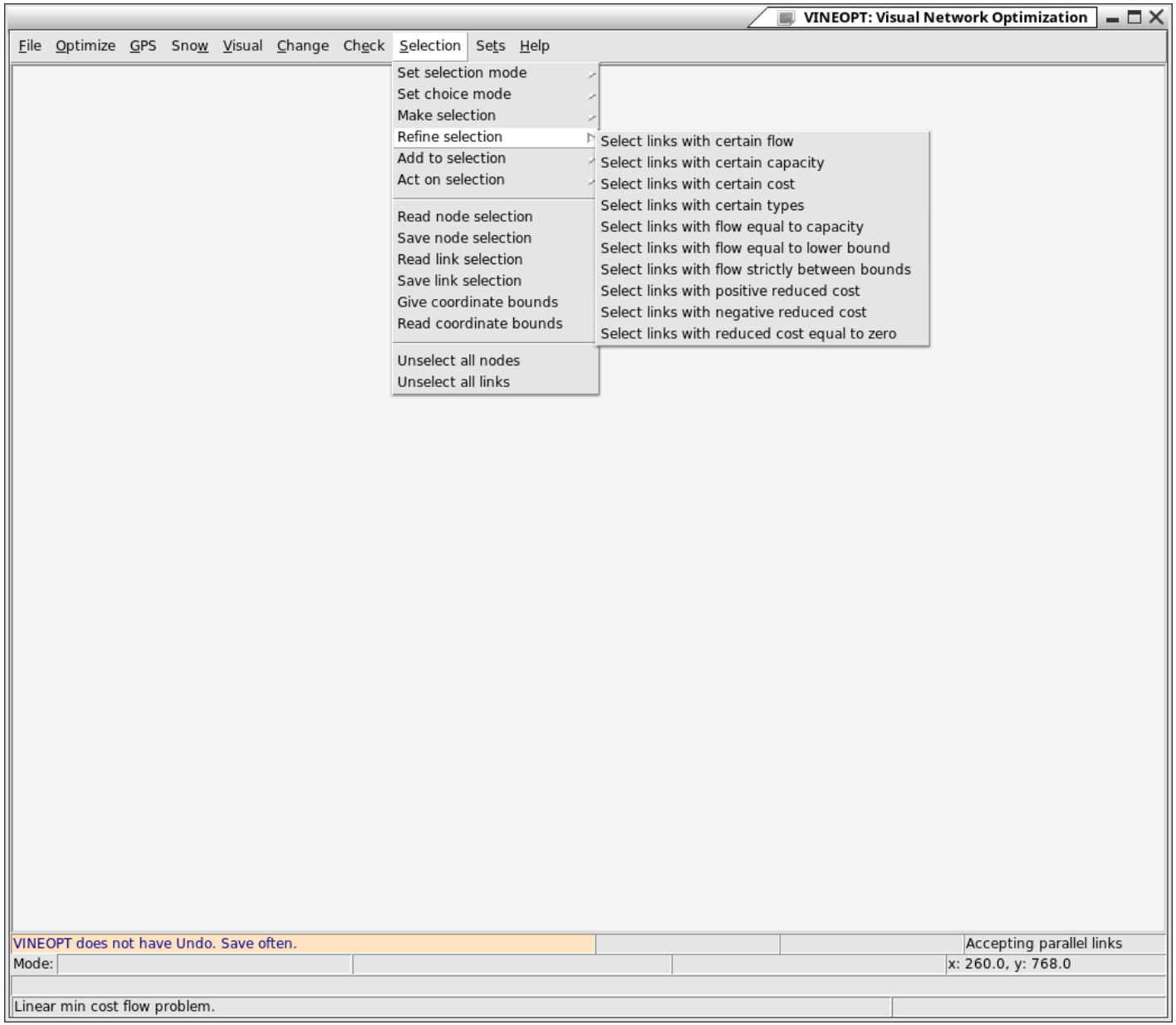
Vineopt menu 7



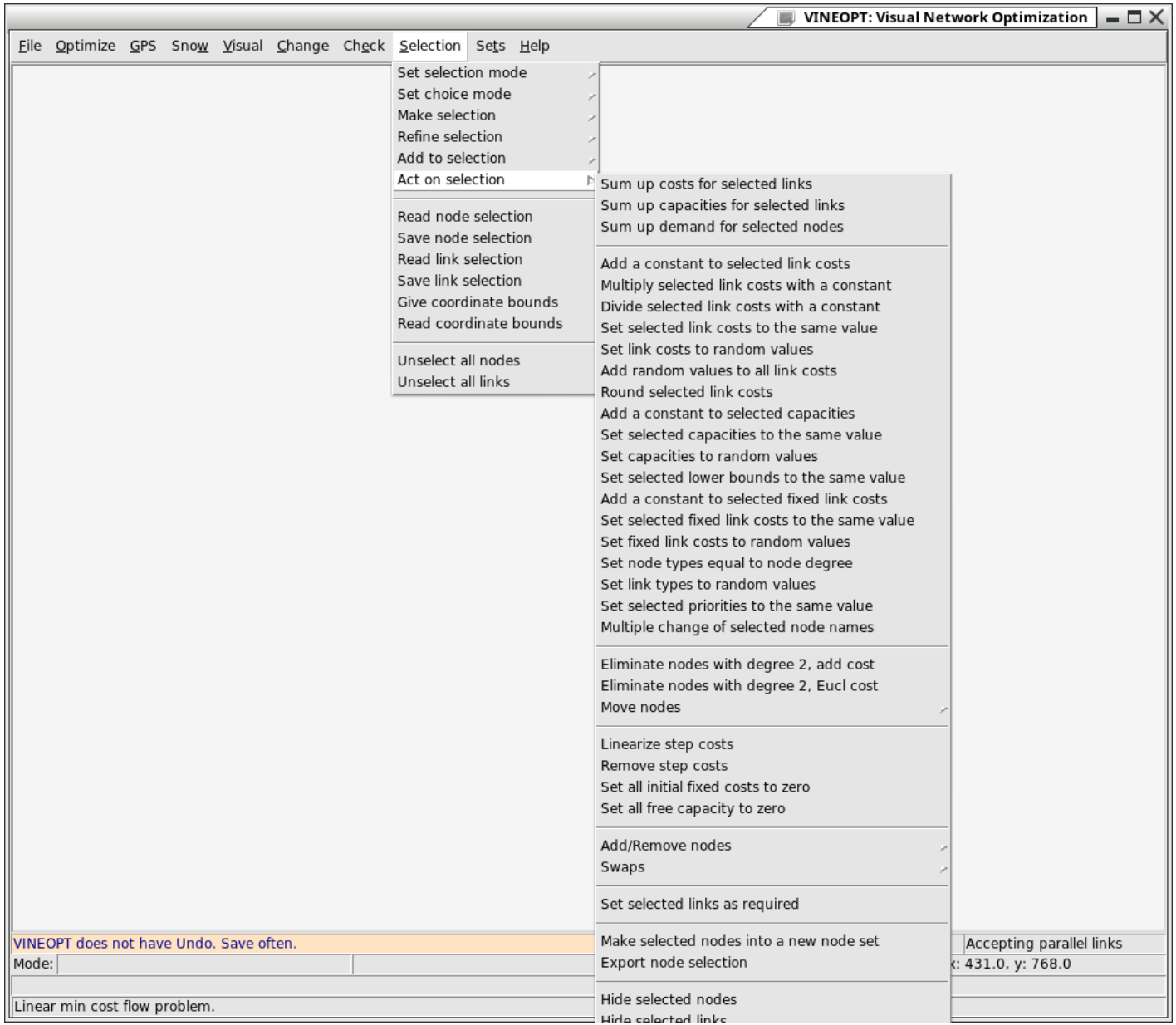
Vineopt menu 8a



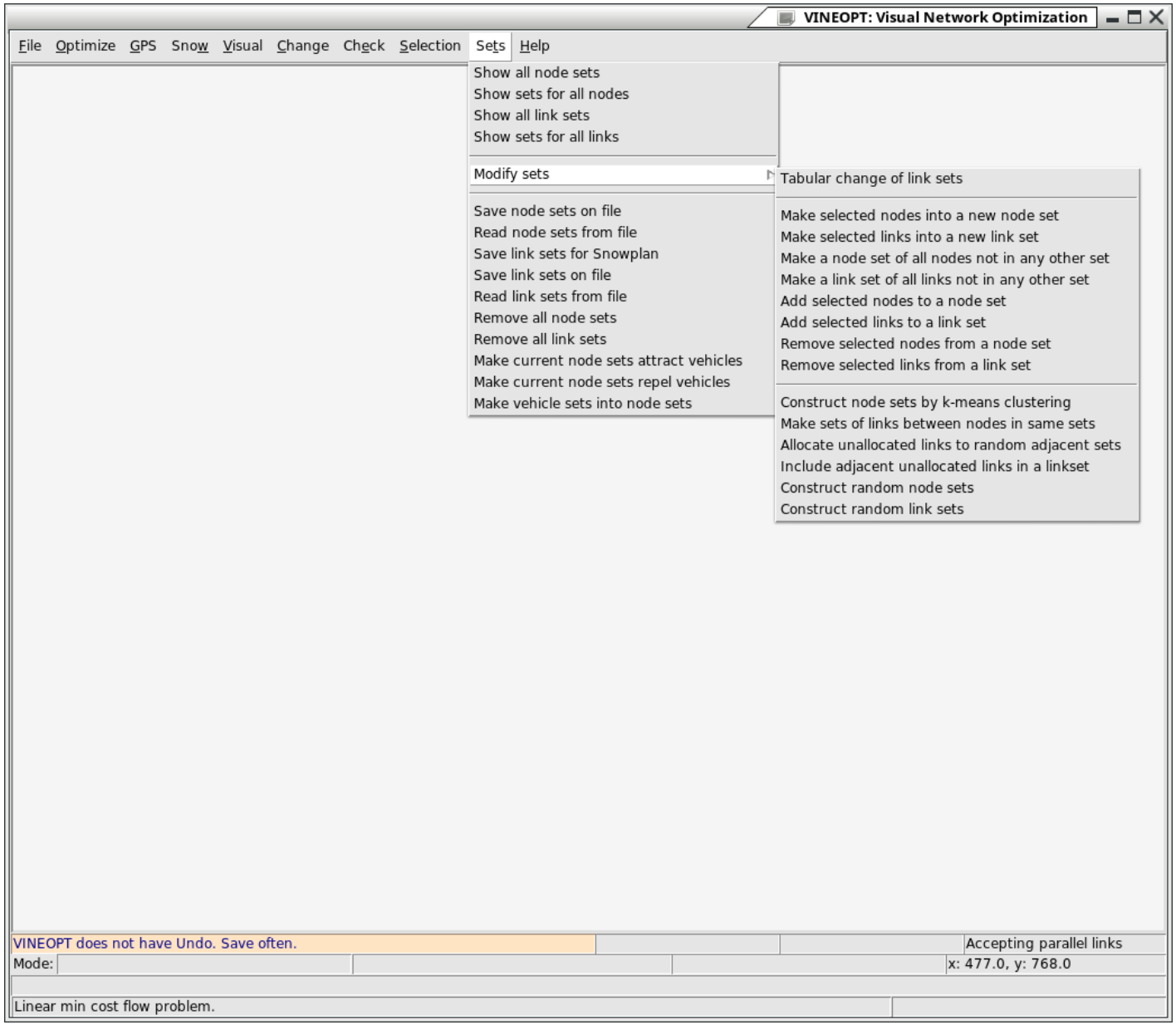
Vineopt menu 8b



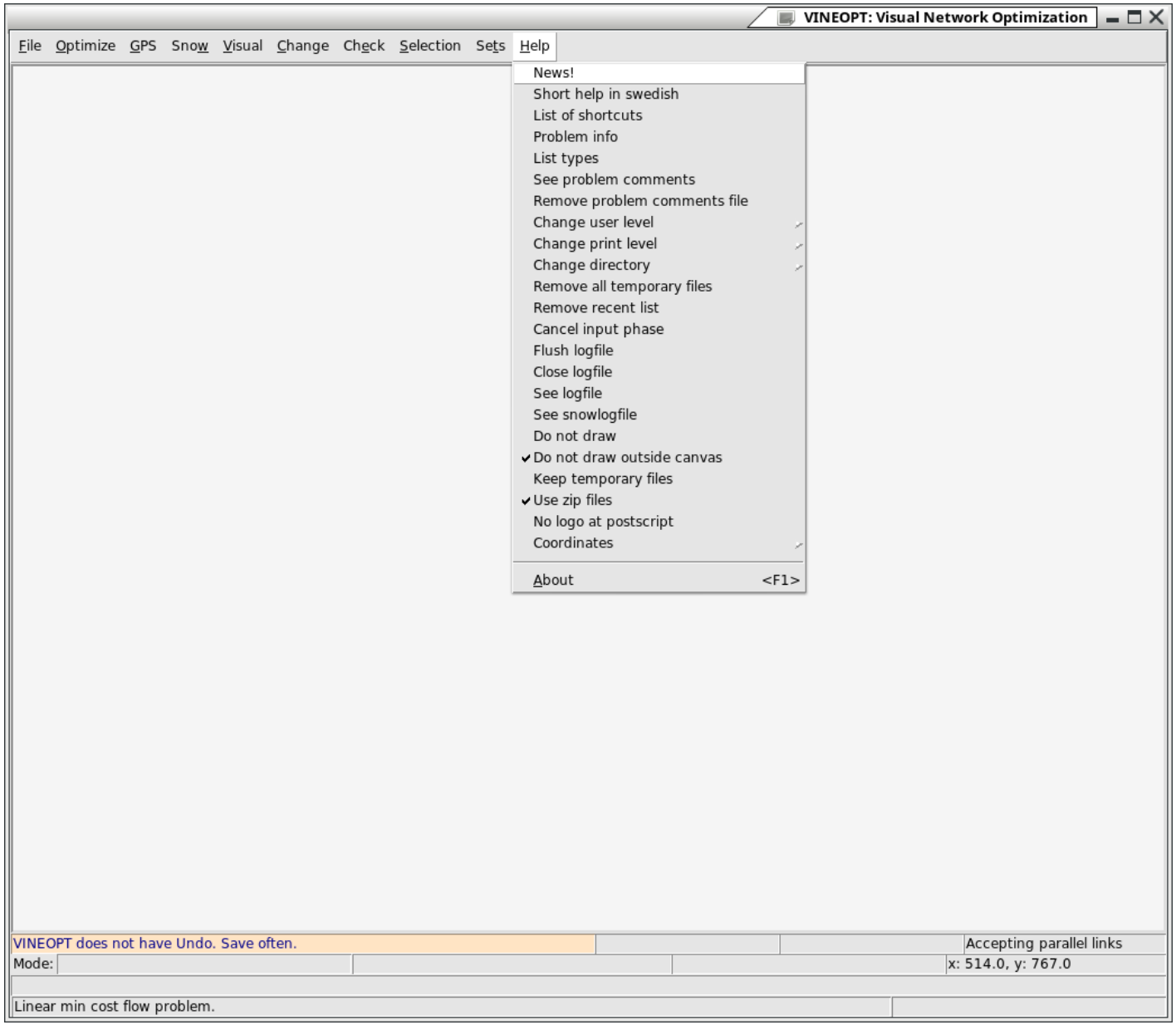
Vineopt menu 8c



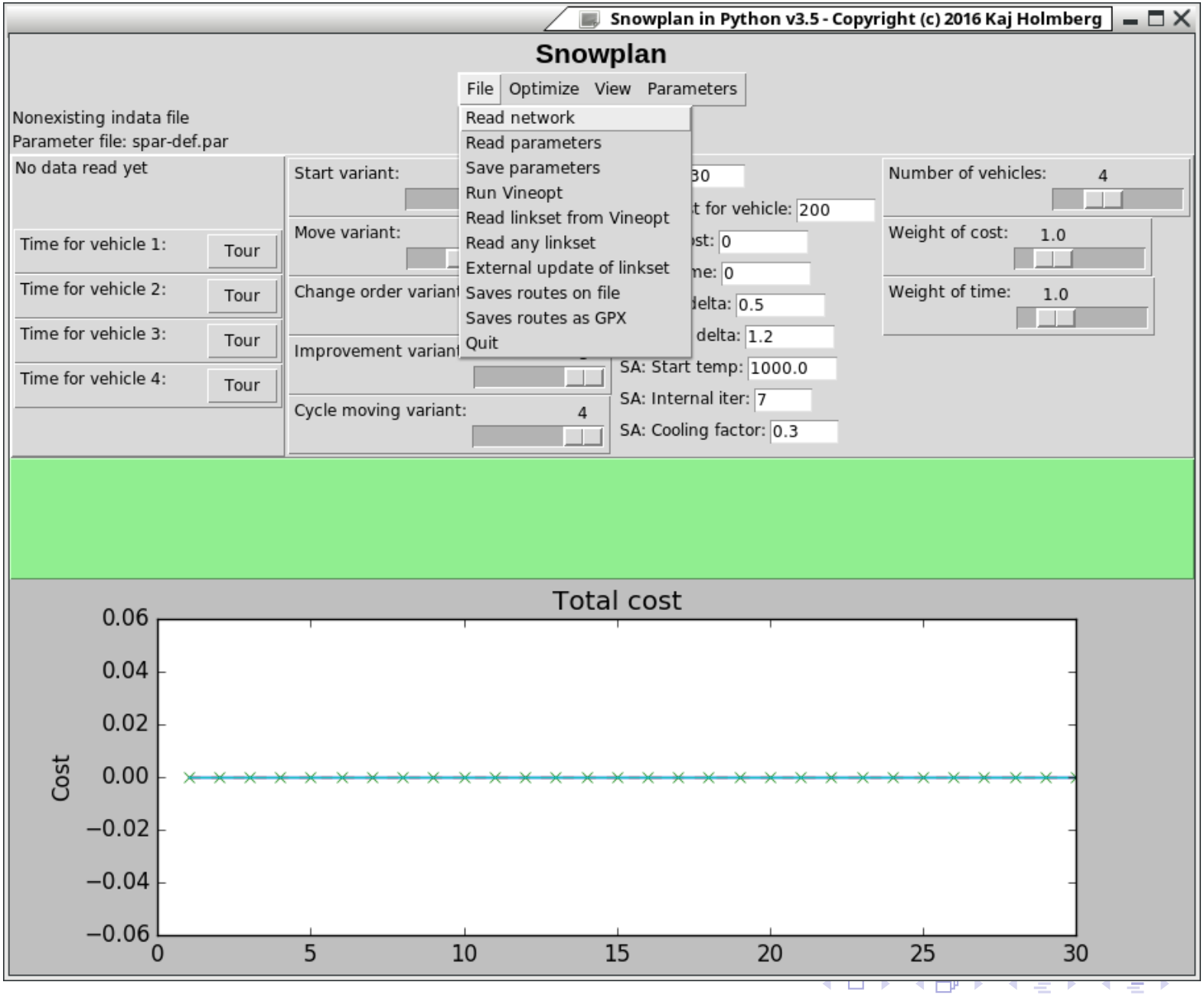
Vineopt menu 9



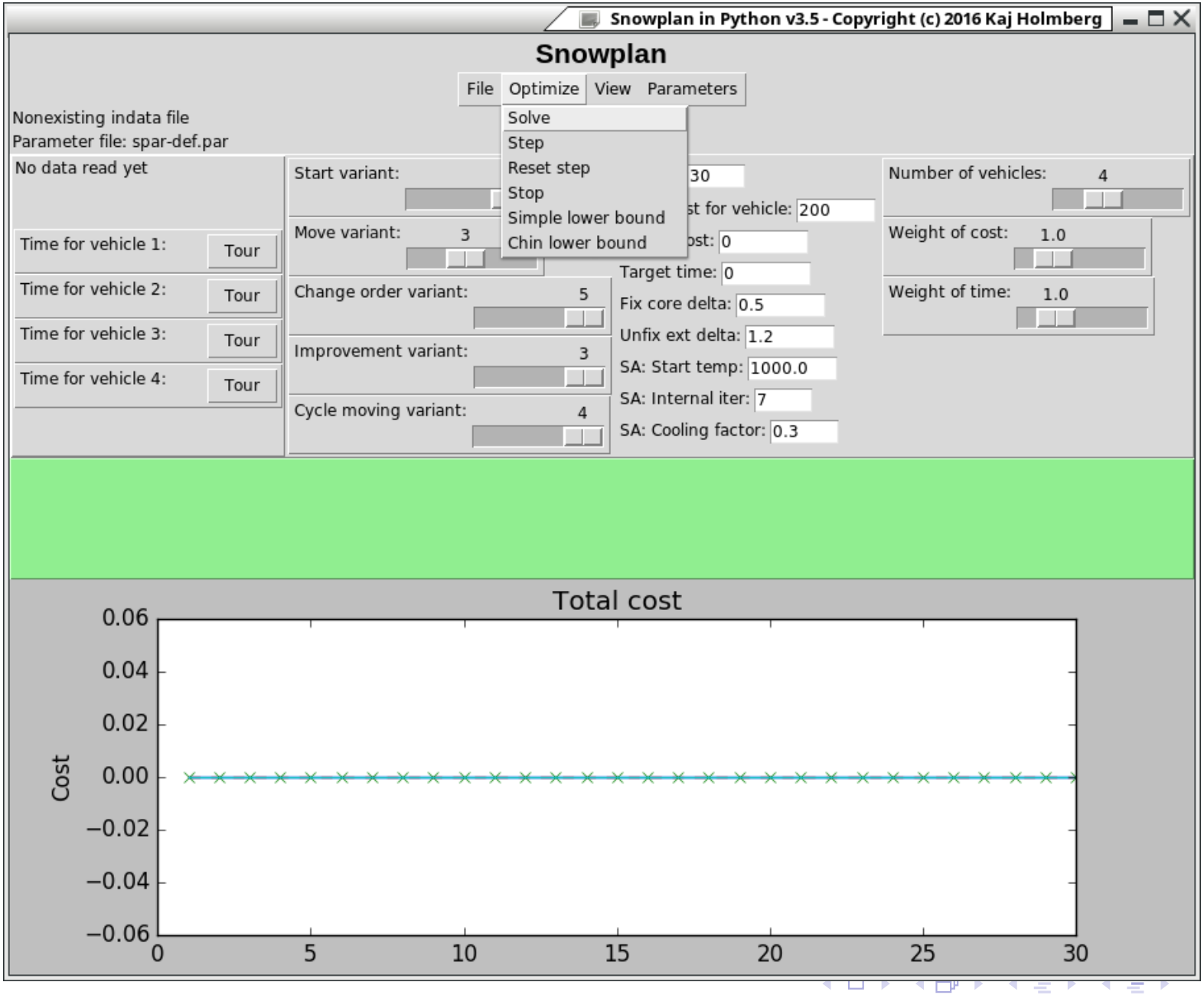
Vineopt menu 10



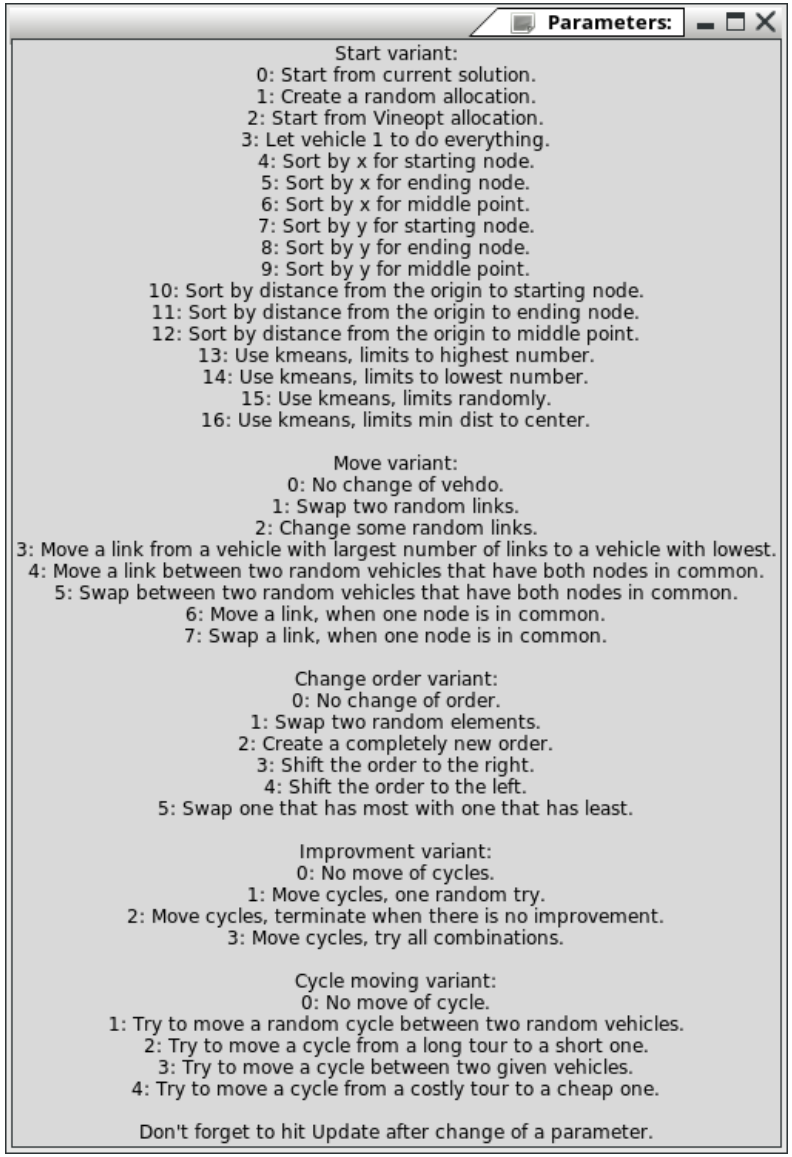
Snowplan menu 1



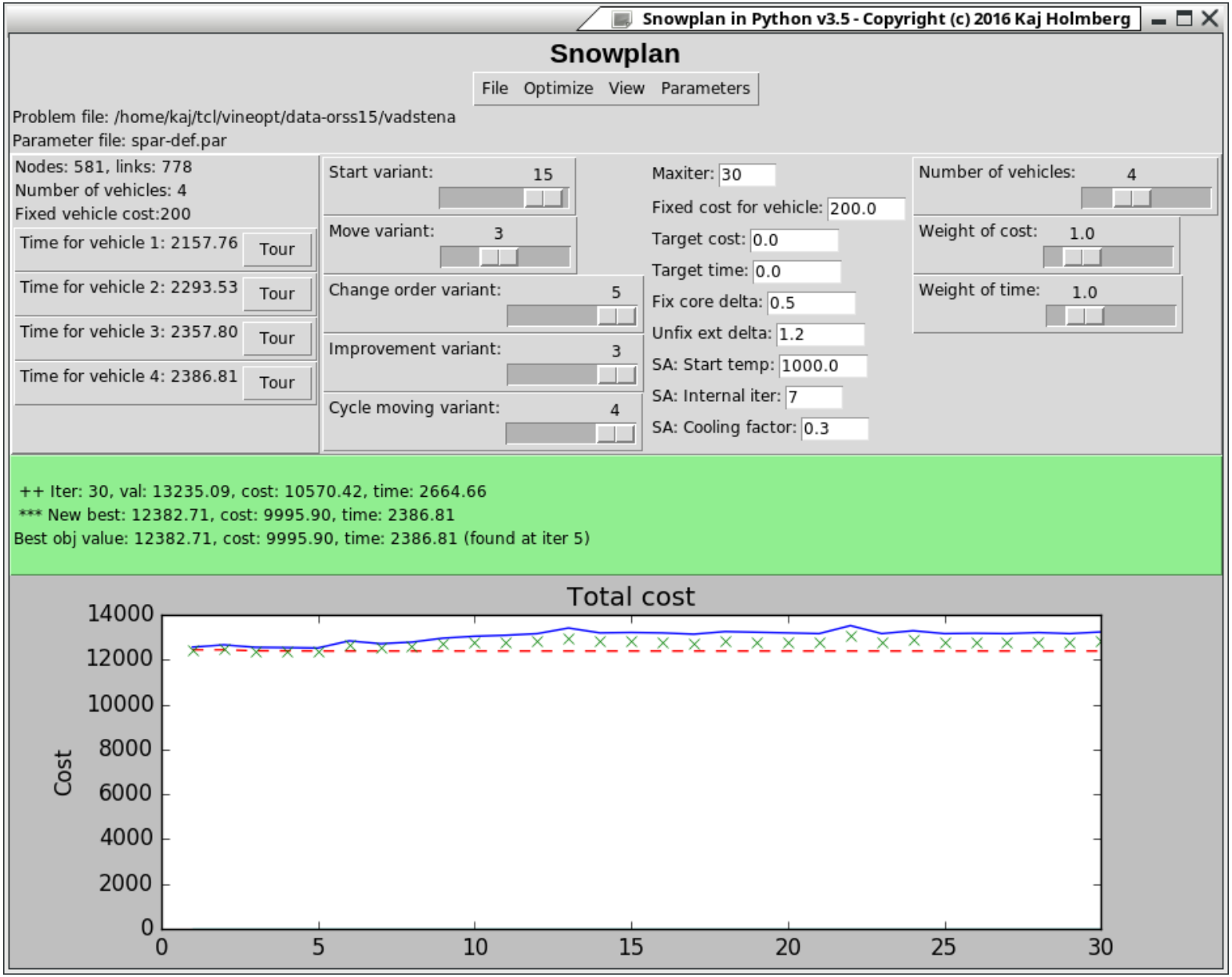
Snowplan menu 2



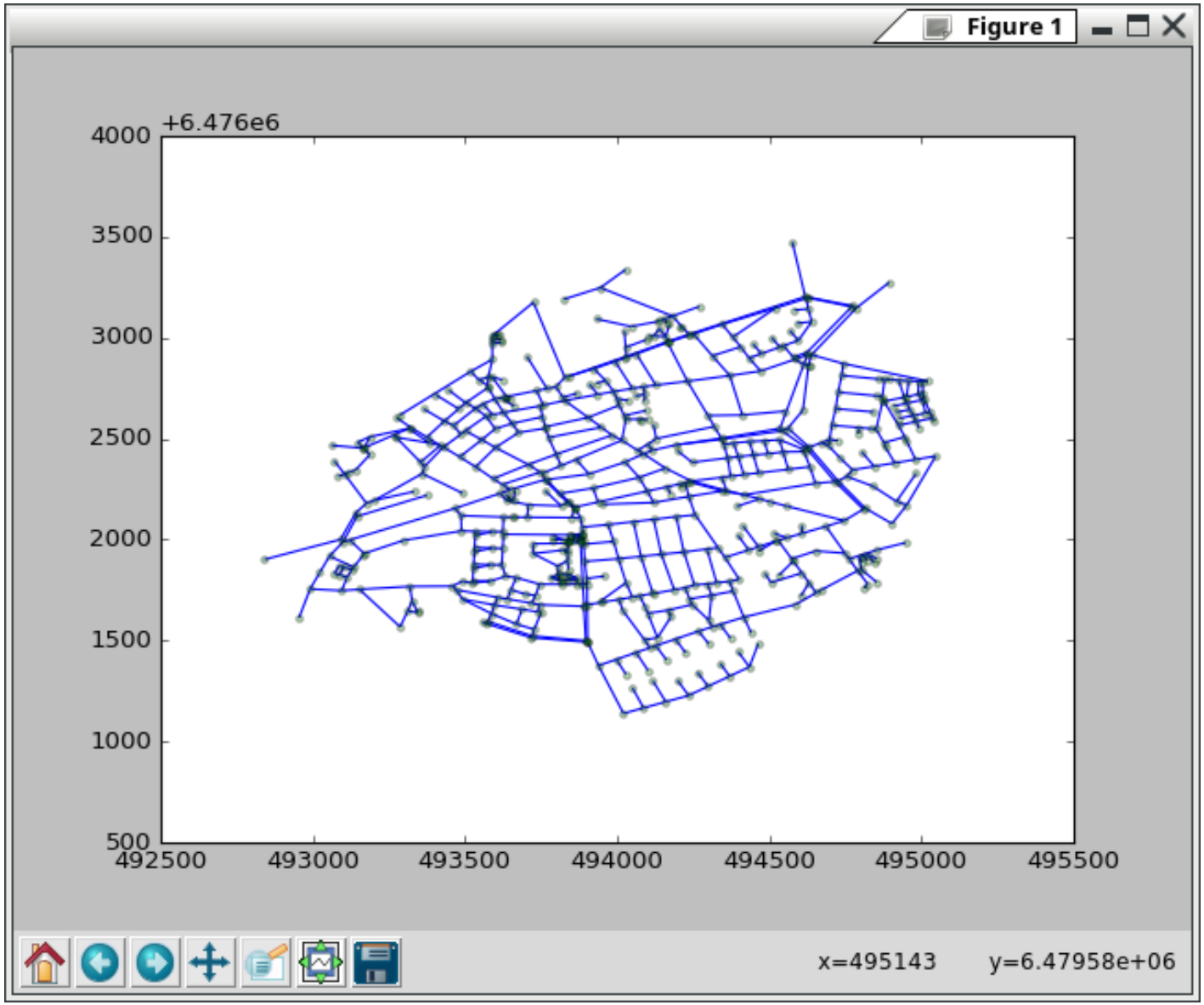
Snowplan info



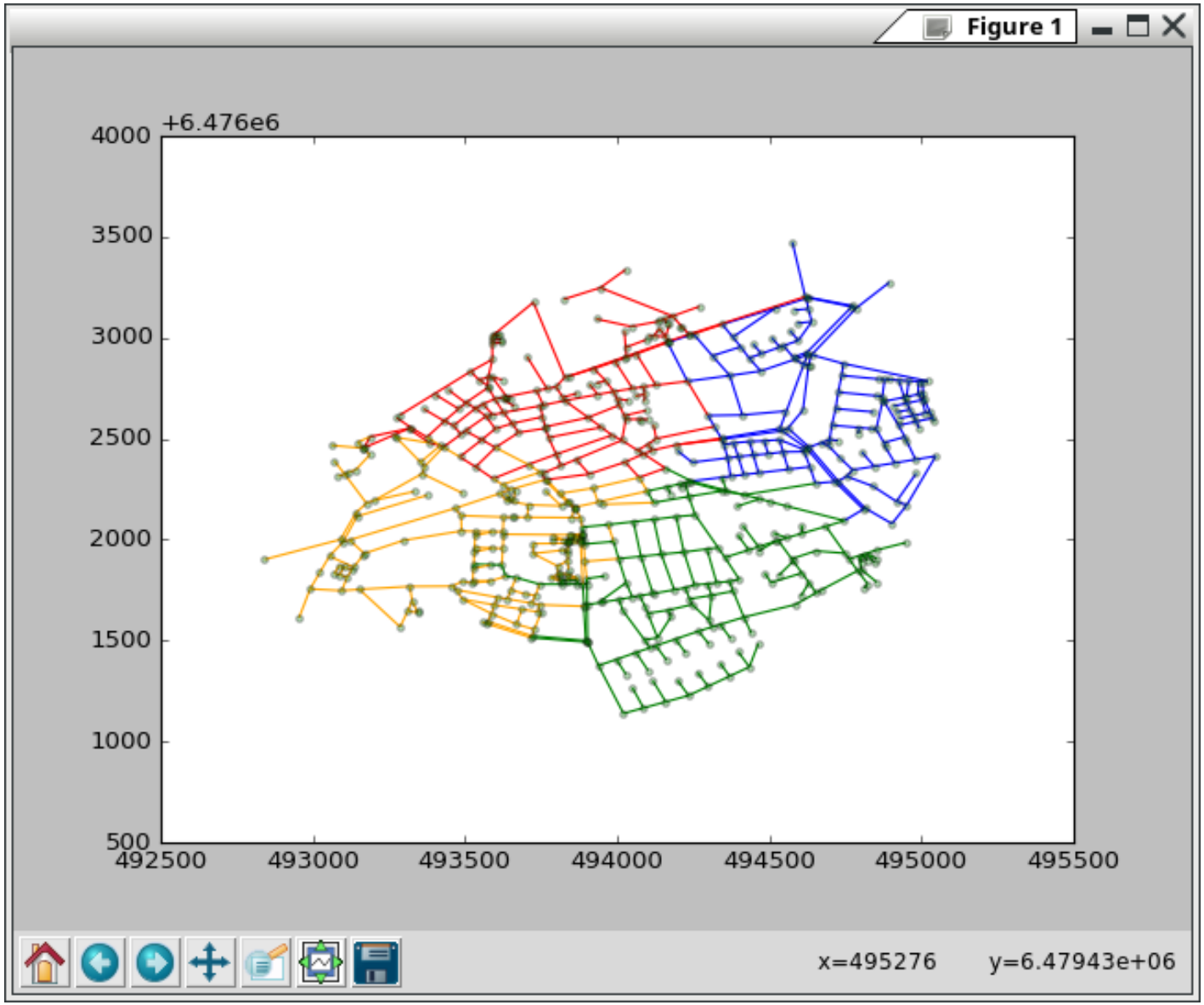
Snowplan: a run - Vadstena



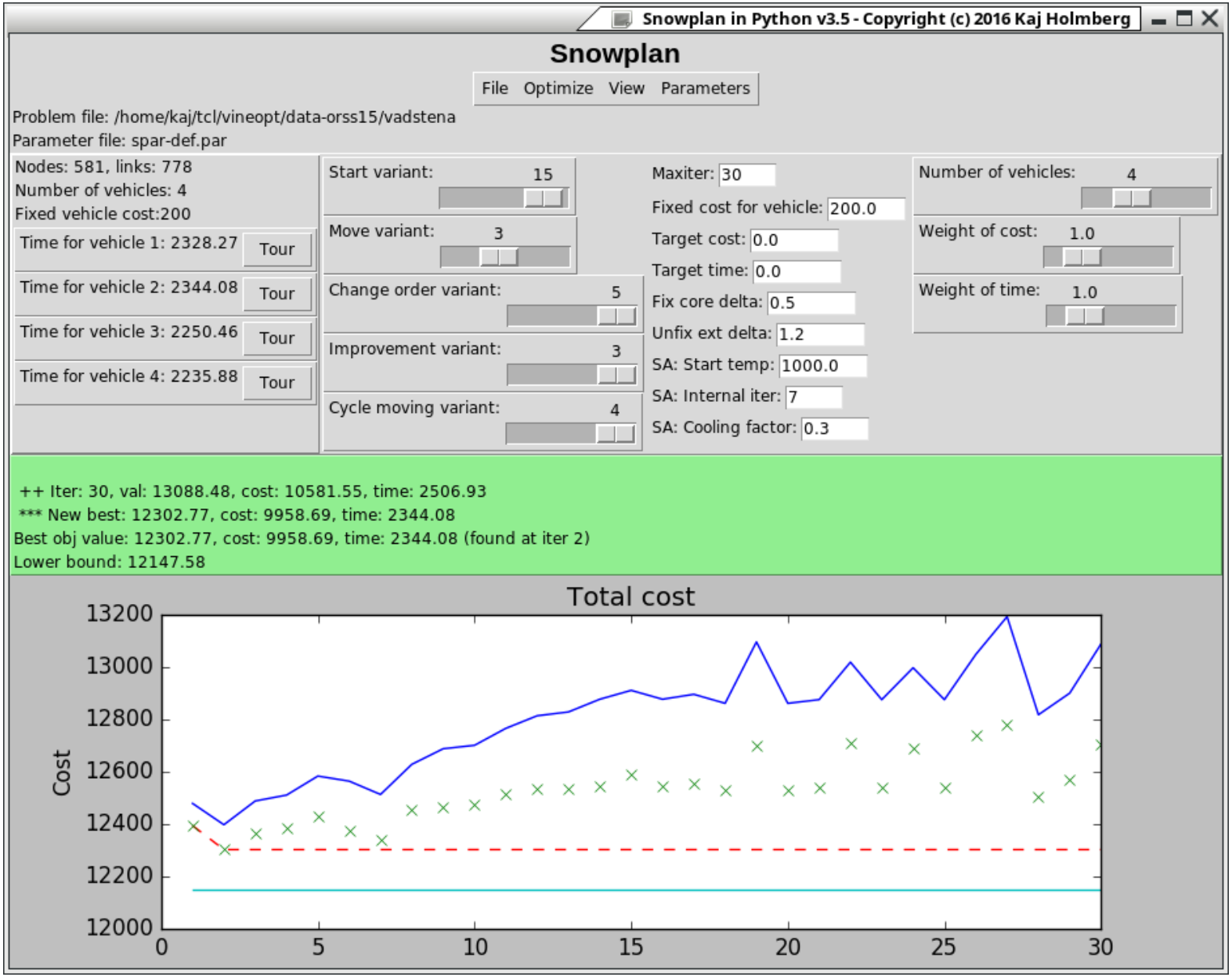
Snowplan: Vadstena network



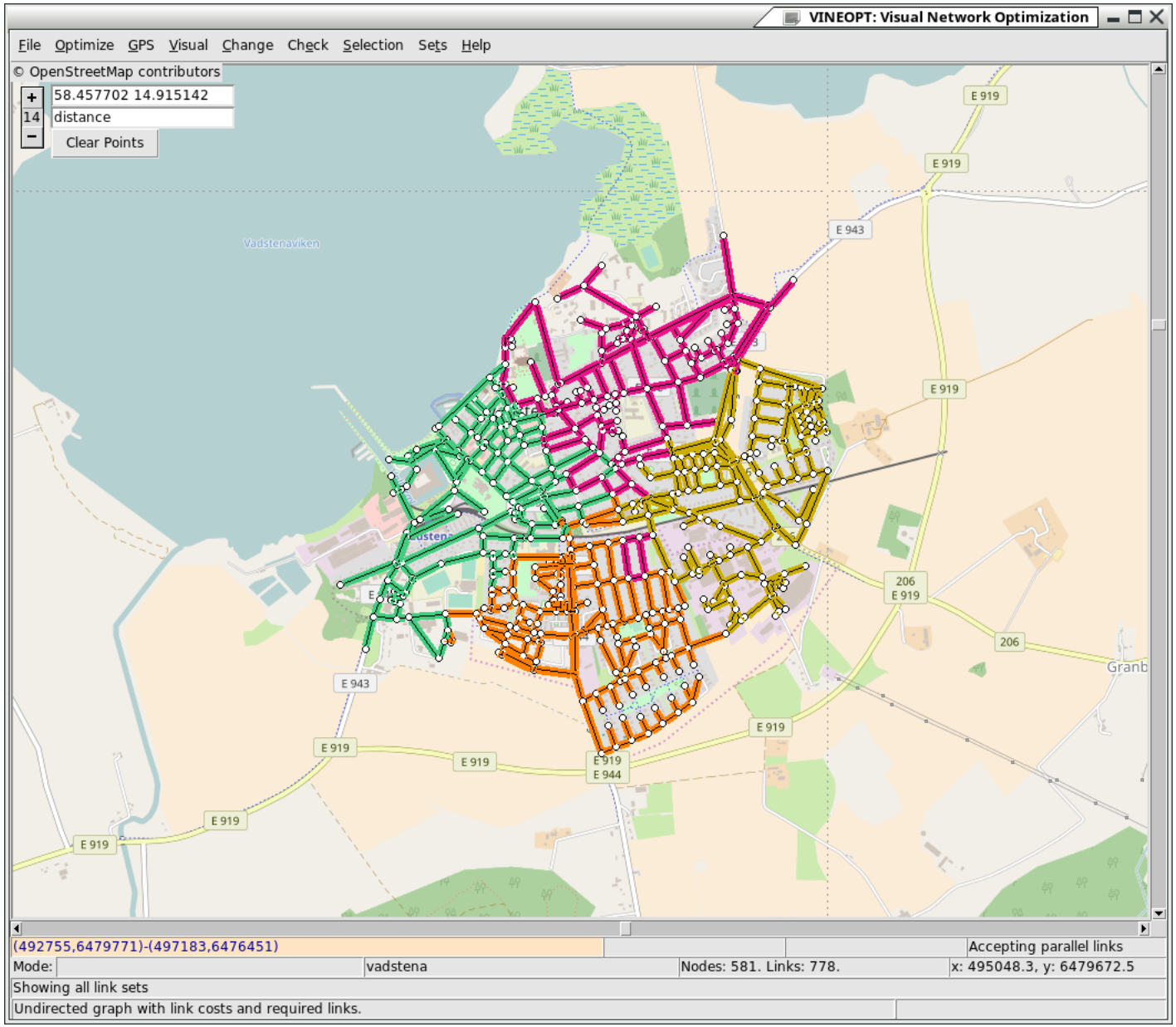
Snowplan: Vadstena allocation



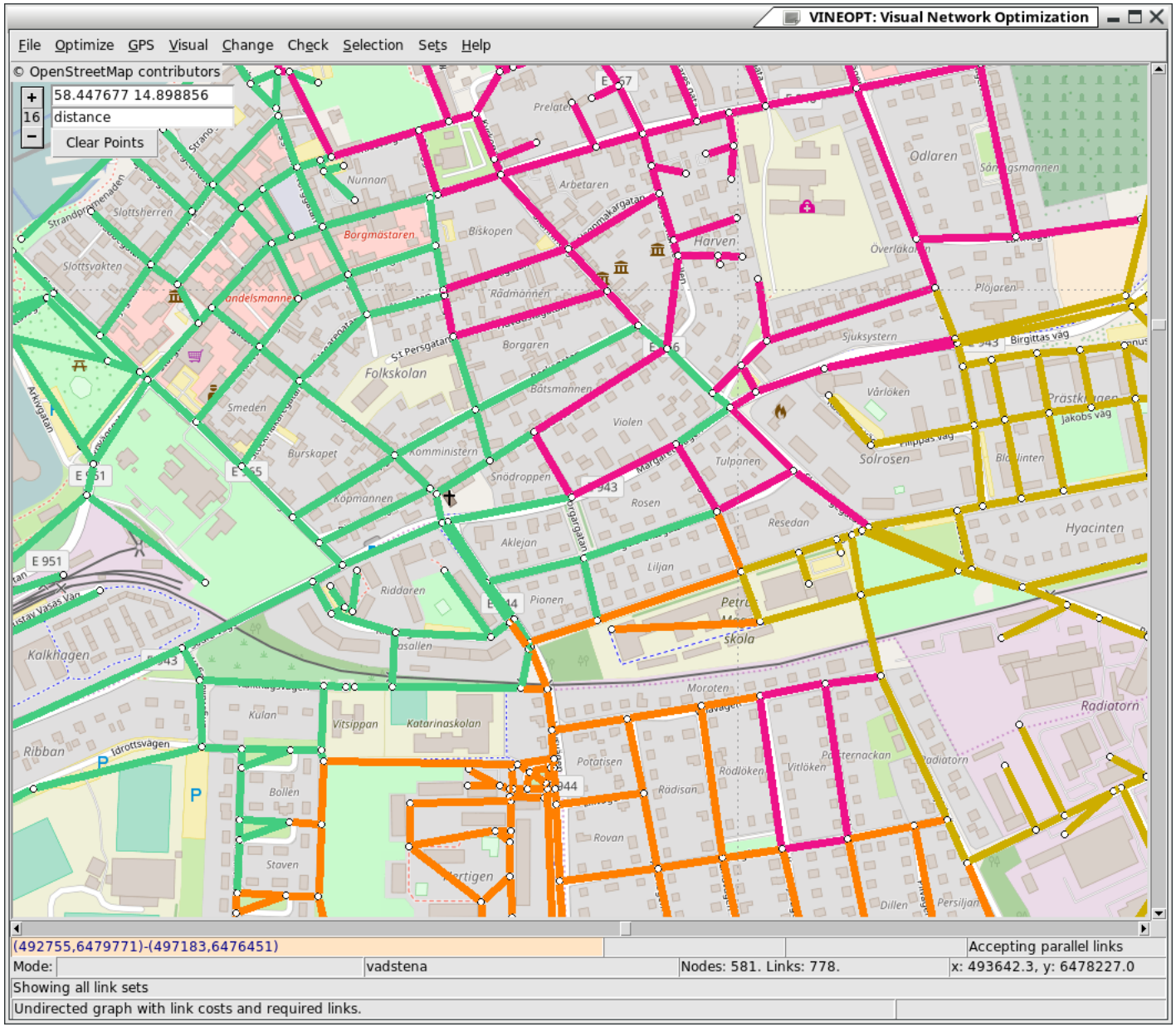
Snowplan: a run with lower bound - Vadstena



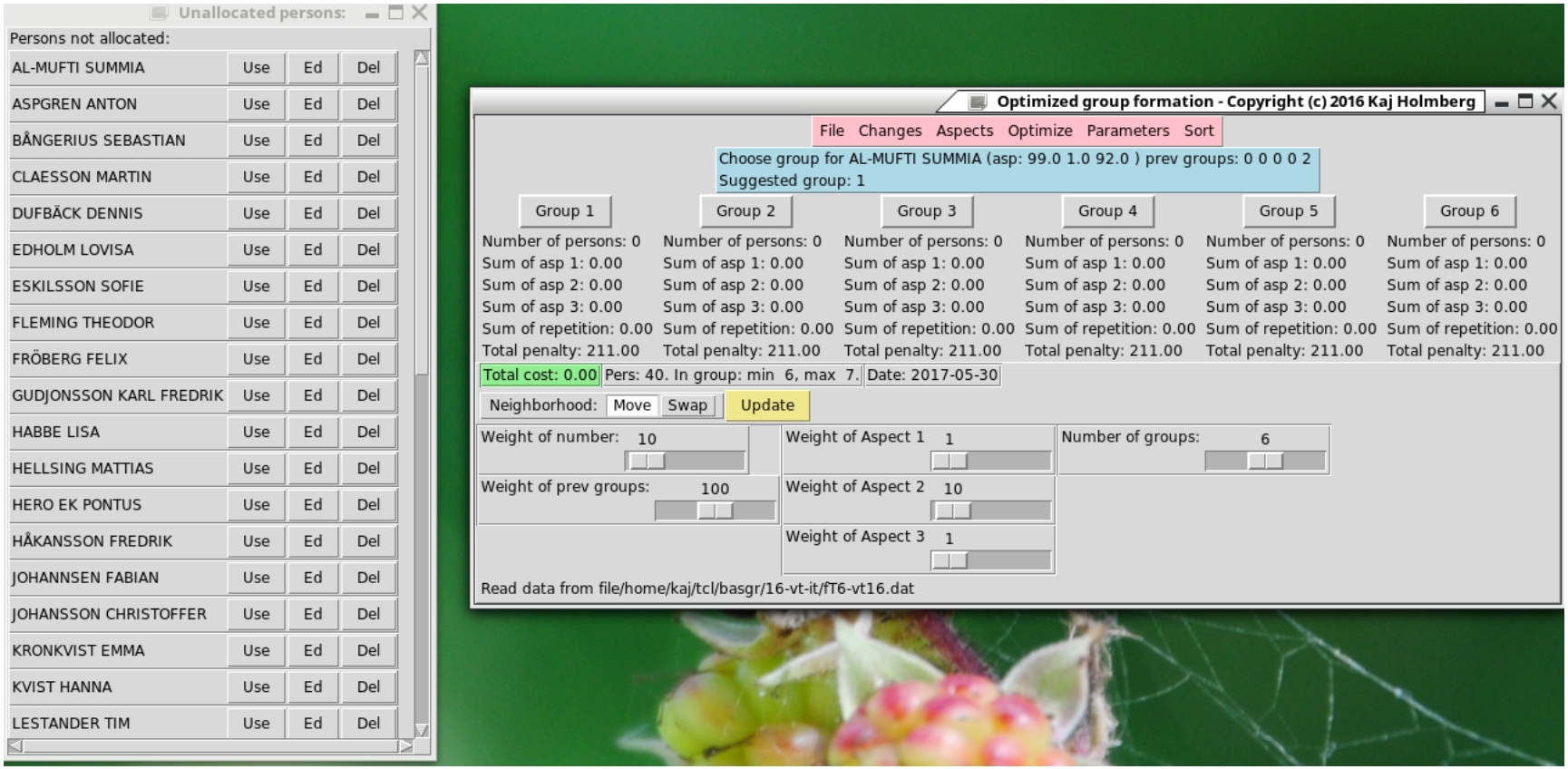
Vineopt with allocation - started from Snowplan



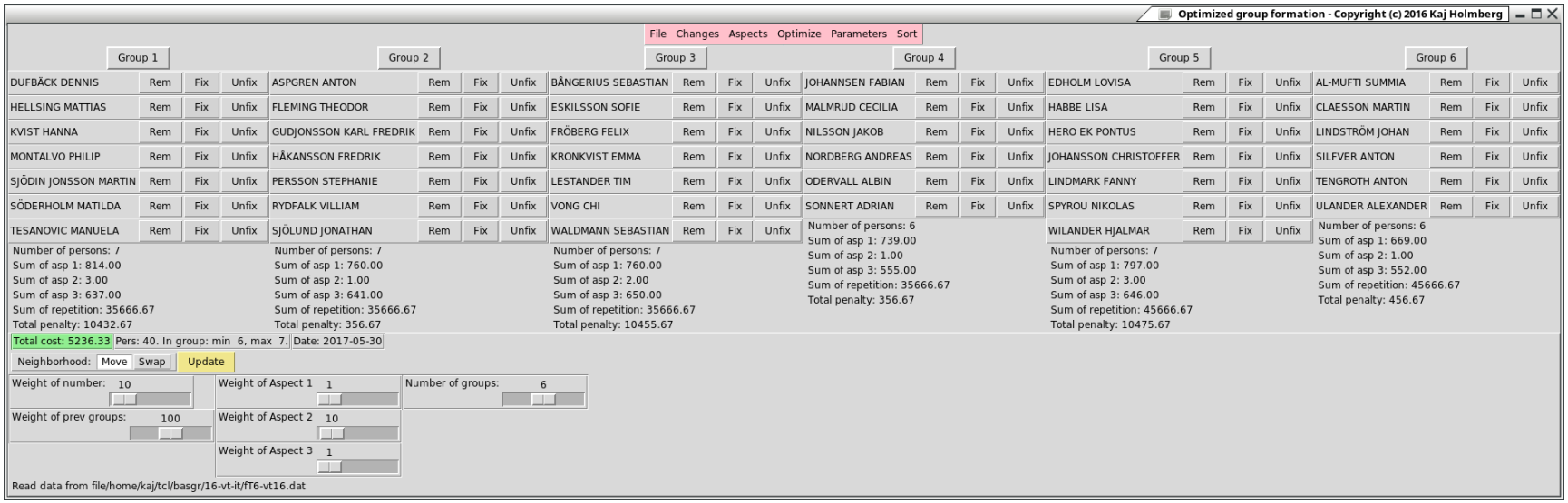
Vineopt with allocation - zoom for manual change



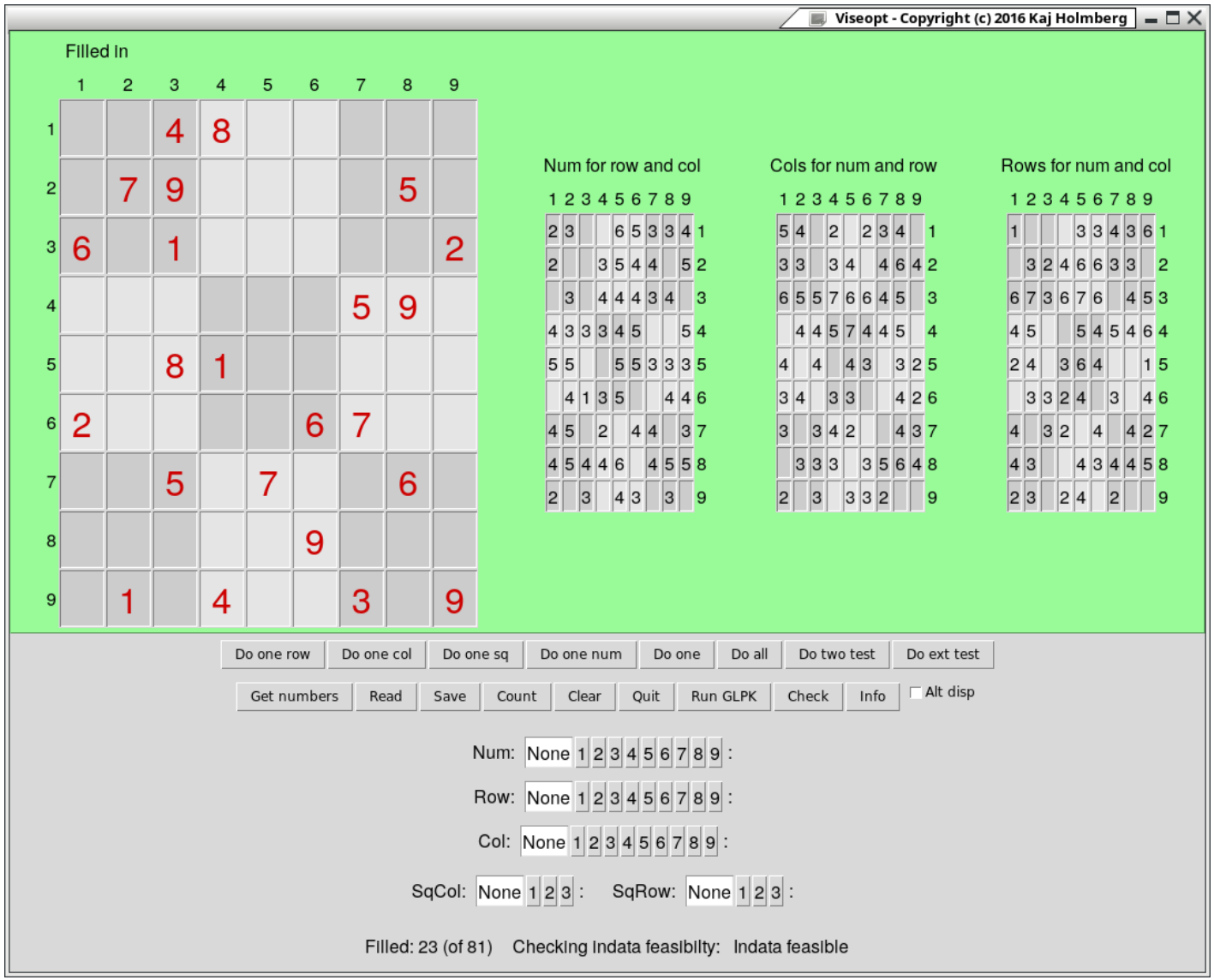
Vigropt: students not allocated



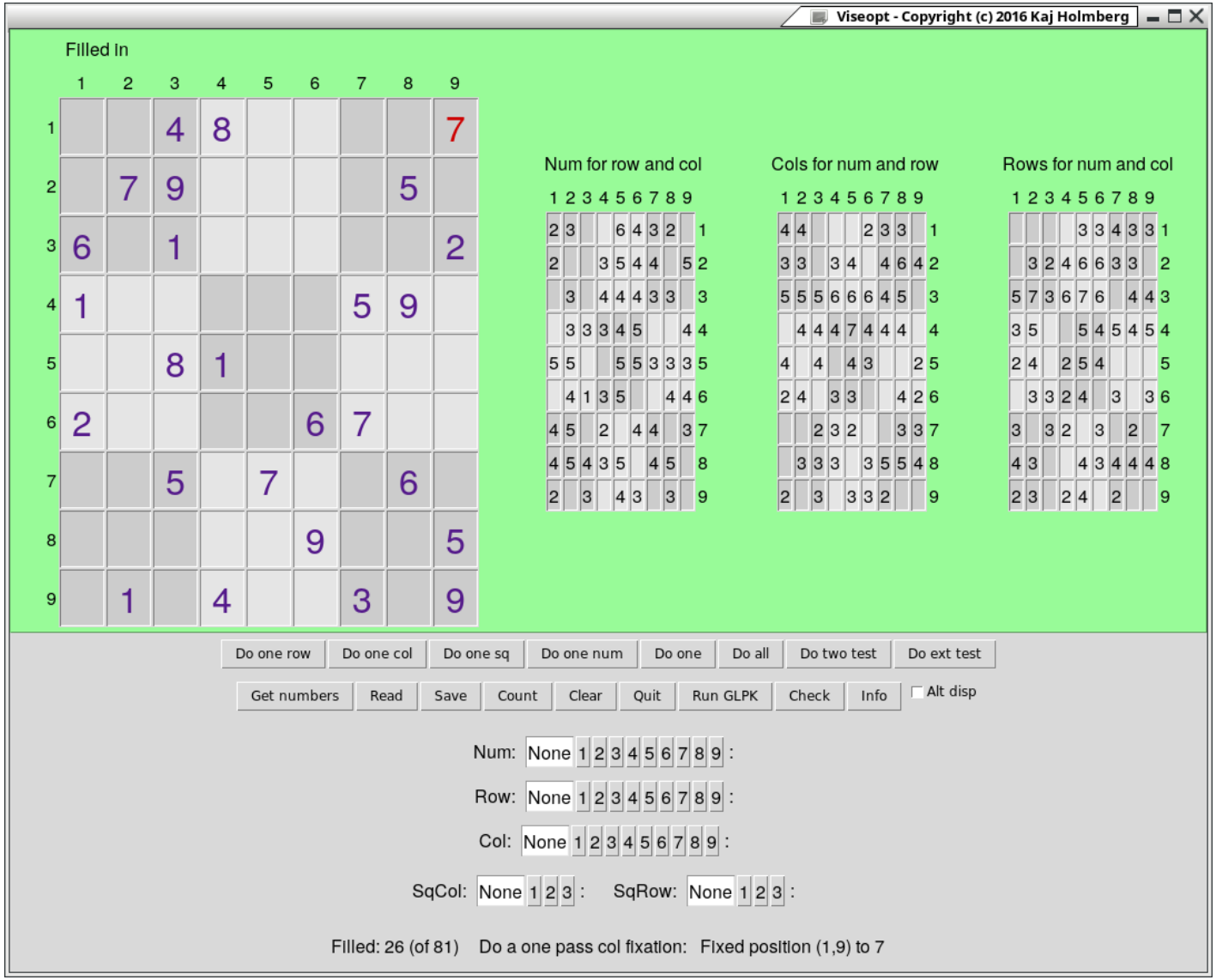
Vigropt: students allocated by heuristic



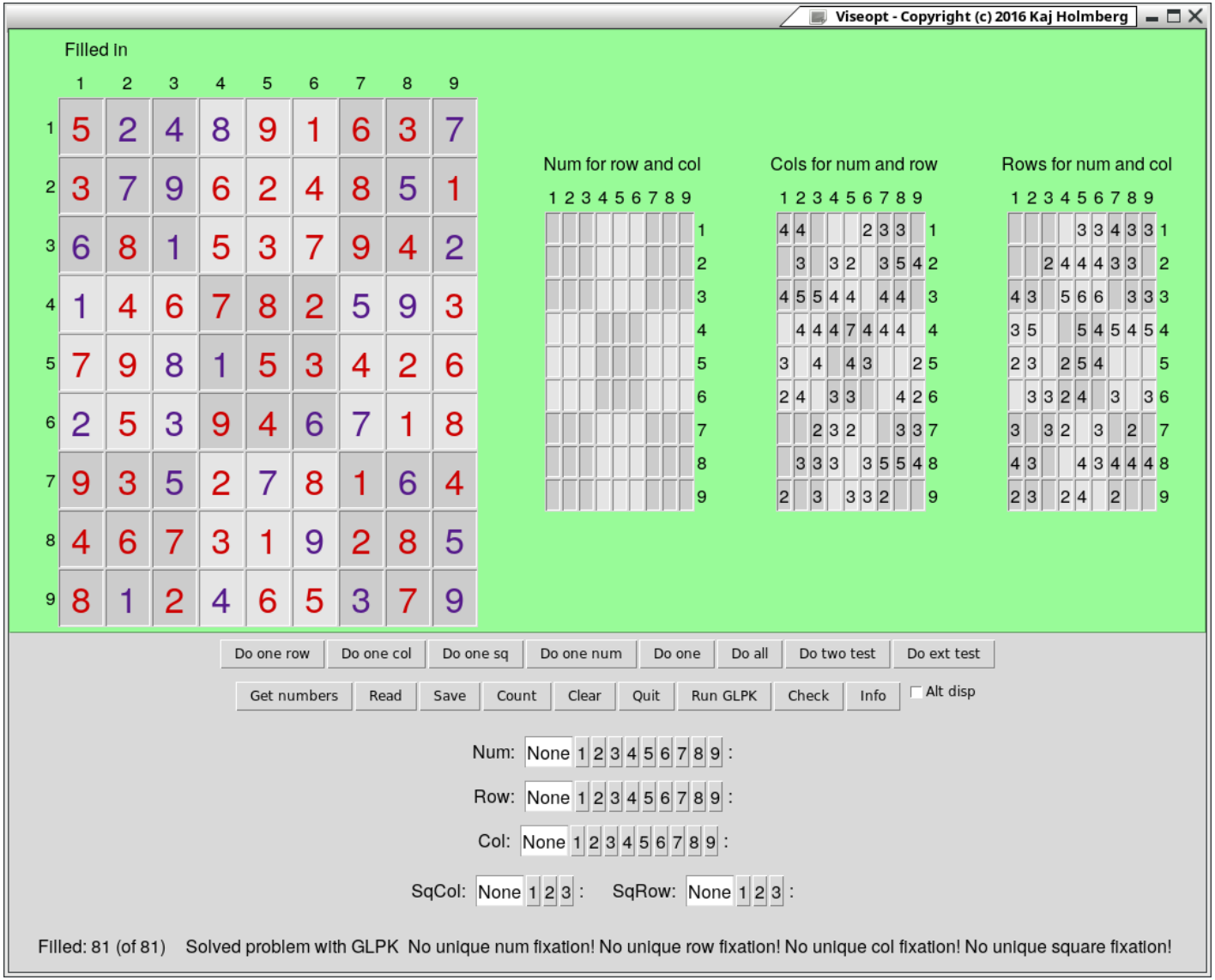
Viseopt


Viseopt - Copyright (c) 2016 Kaj Holmberg
Filled In
Num for row and col
Cols for num and row
Rows for num and col
Do one row
Do one col
Do one sq
Do one num
Do one
Do all
Do two test
Do ext test
Get numbers
Read
Save
Count
Clear
Quit
Run GLPK
Check
Info
Alt disp
Num:
Row:
Col:
SqCol:
SqRow:
Filled: 23 (of 81)
Checking Indata feasibilty:
Indata feasible

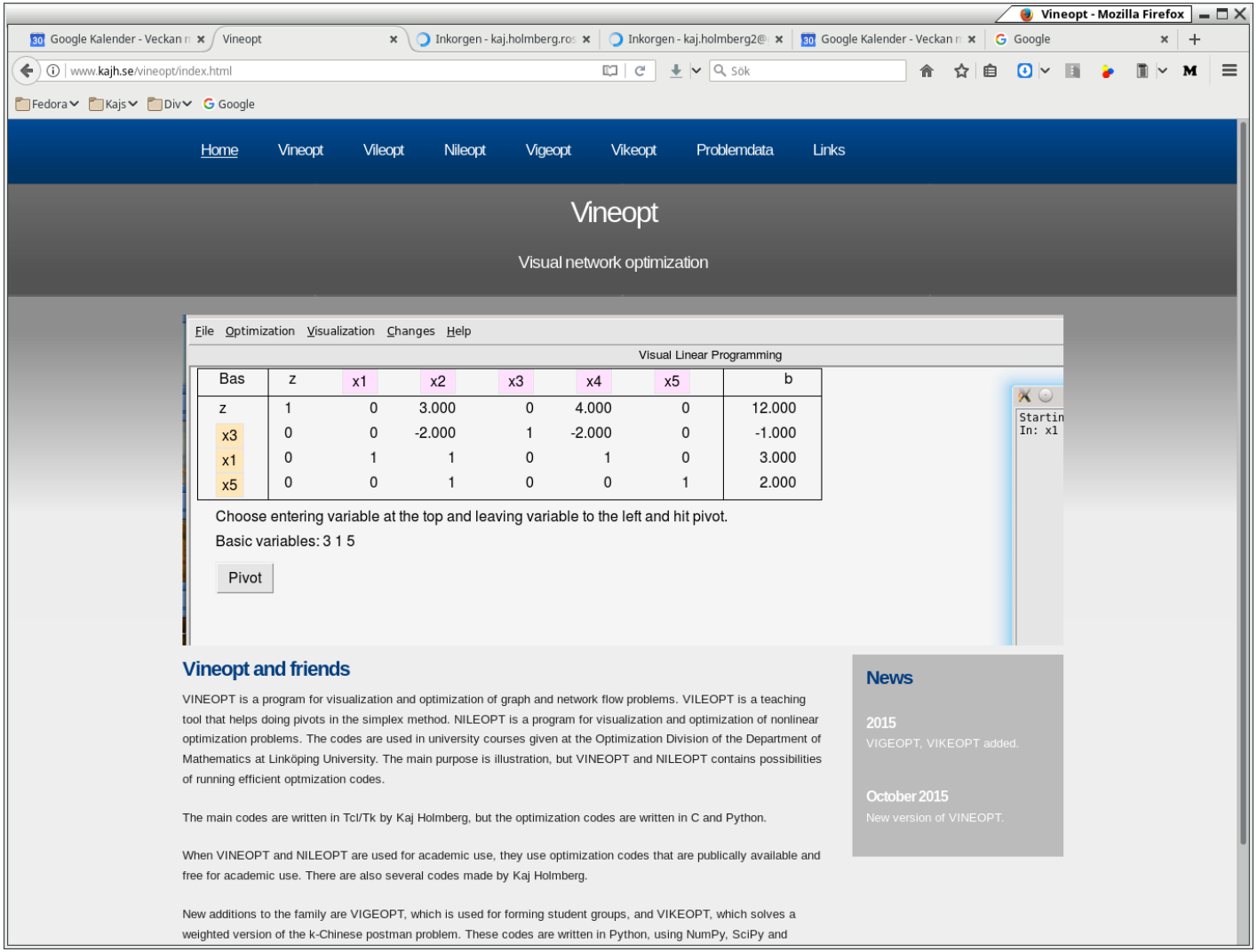
Viseopt: one step



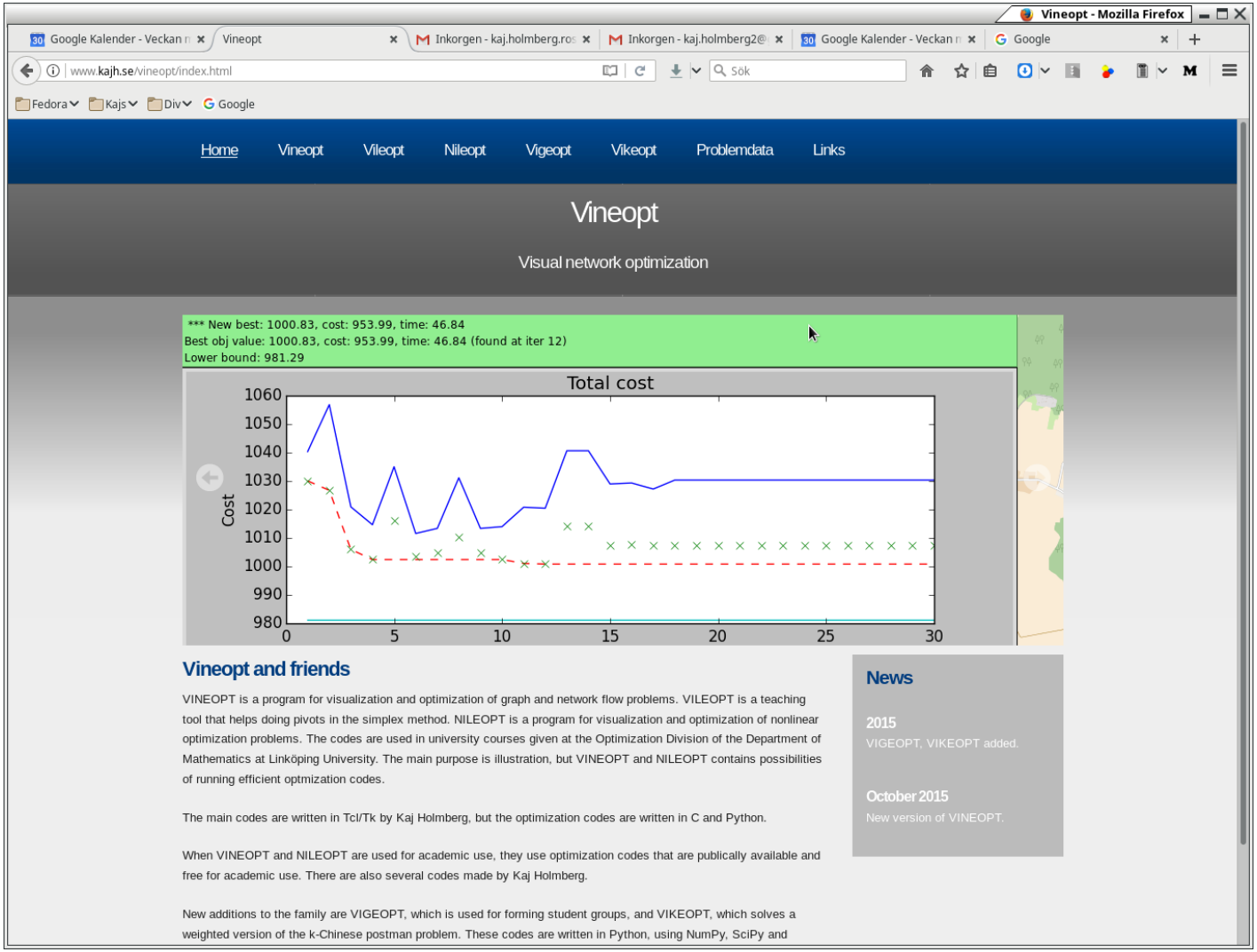
Viseopt: full solution by GLPK



Vineopt homepage



Vineopt homepage



The end

Questions?

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