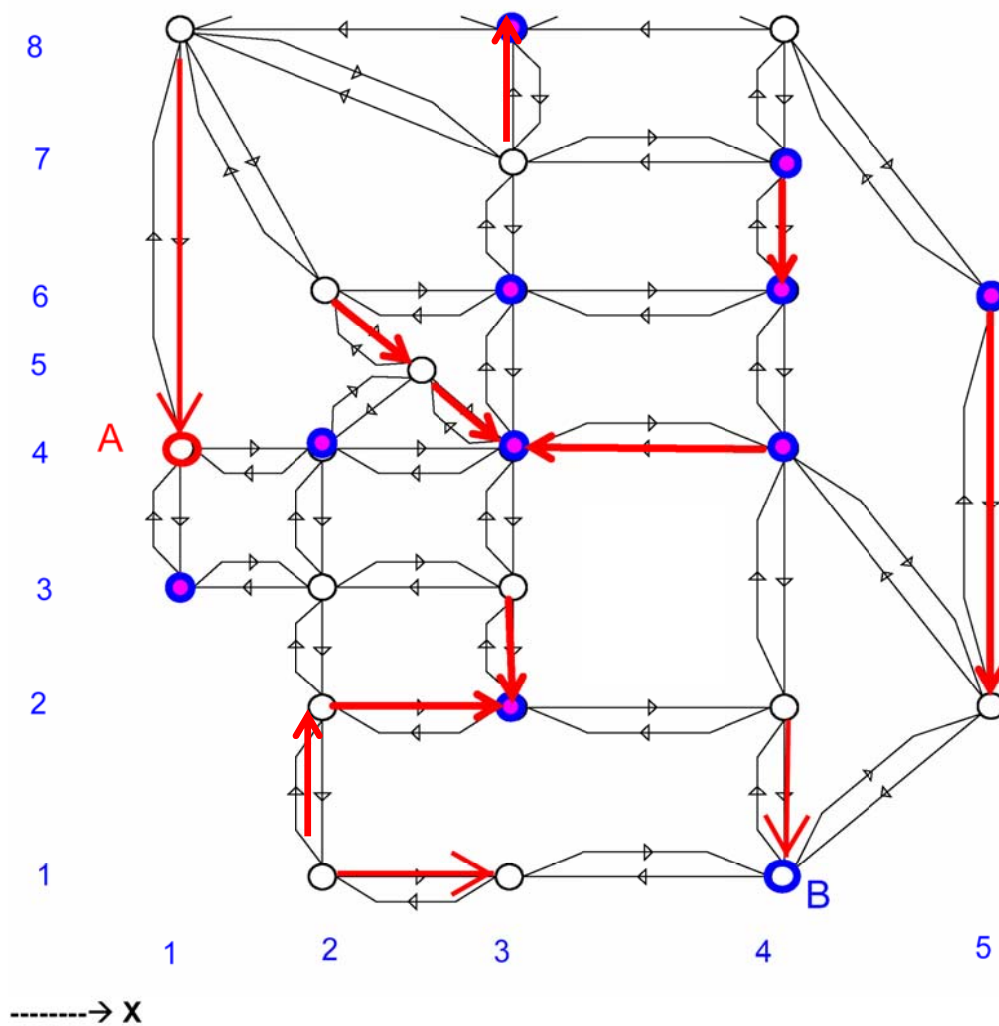


Links in red are the candidate set of links  $\hat{A}$  which can be added to the network. Nodes A,B are the origins of flows. Blue nodes marked with pink circle in the center are destinations for flows originating at nodes A and B. Assign to each node in the network coordinates as marked with the figures in blue on the x and y axis. Assume that each origin generates to each of the corresponding destinations 10 units of flow.

Adopt as exploitation costs  $c_{i,j}$  of each link:  $c_{i,j} = 95 + (x_i - x_j)^2 + (y_i - y_j)^2$ ,  $(i,j) \in AU\hat{A}$

Adopt as investment costs  $f_{ij} = 10 * (|x_i - x_j| + |y_i - y_j|)$ ,  $(i,j) \in \hat{A}$

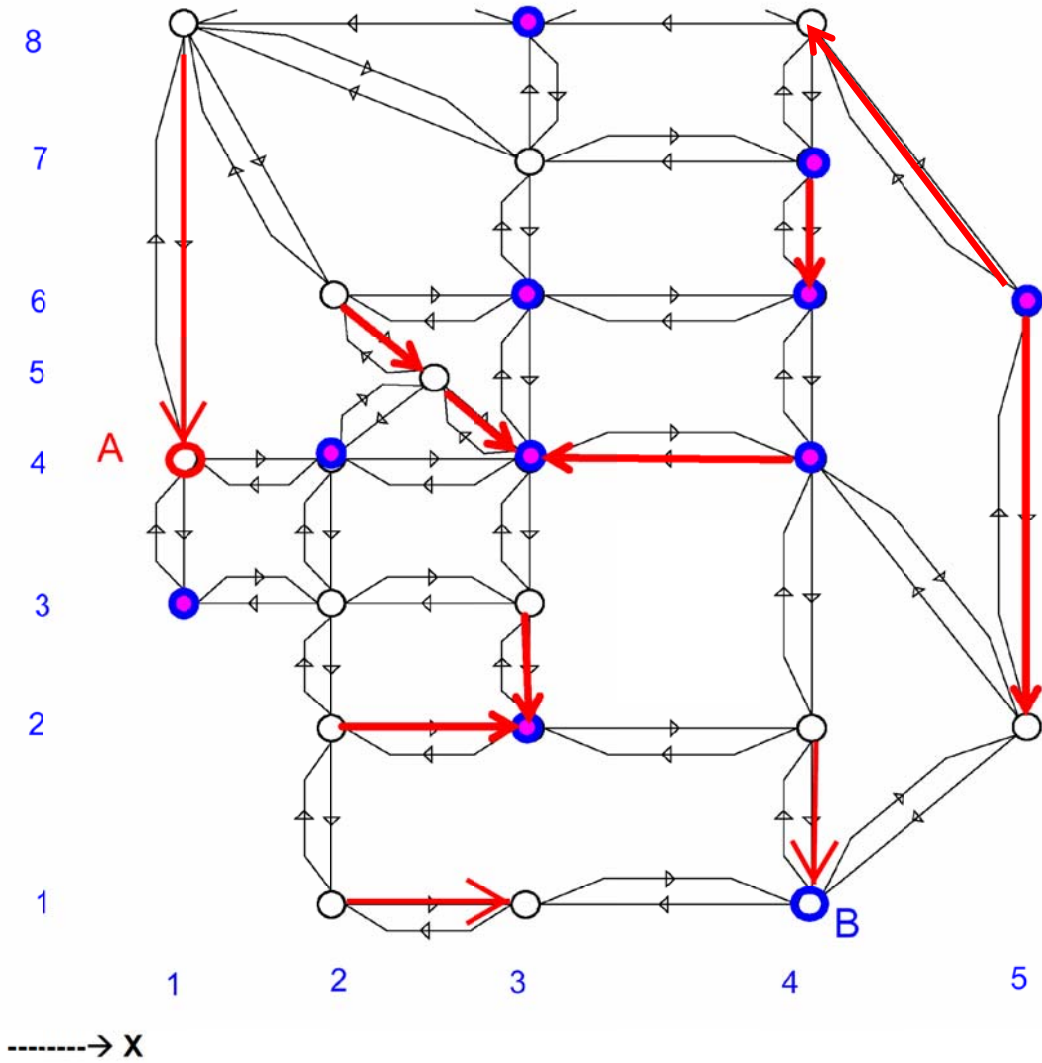




Links in red are the candidate set of links  $\hat{A}$  which can be added to the network. Nodes A,B are the origins of flows. Blue nodes marked with pink circle in the center are destinations for flows originating at nodes A and B. Assign to each node in the network coordinates as marked with the figures in blue on the x and y axis. Assume that each origin generates to each of the corresponding destinations 10 units of flow

Adopt as exploitation costs  $c_{i,j}$  of each link:  $c_{i,j} = 78 + 2(x_i - x_j)^2 + 3(y_i - y_j)^2$ ,  $(i,j) \in AU\hat{A}$

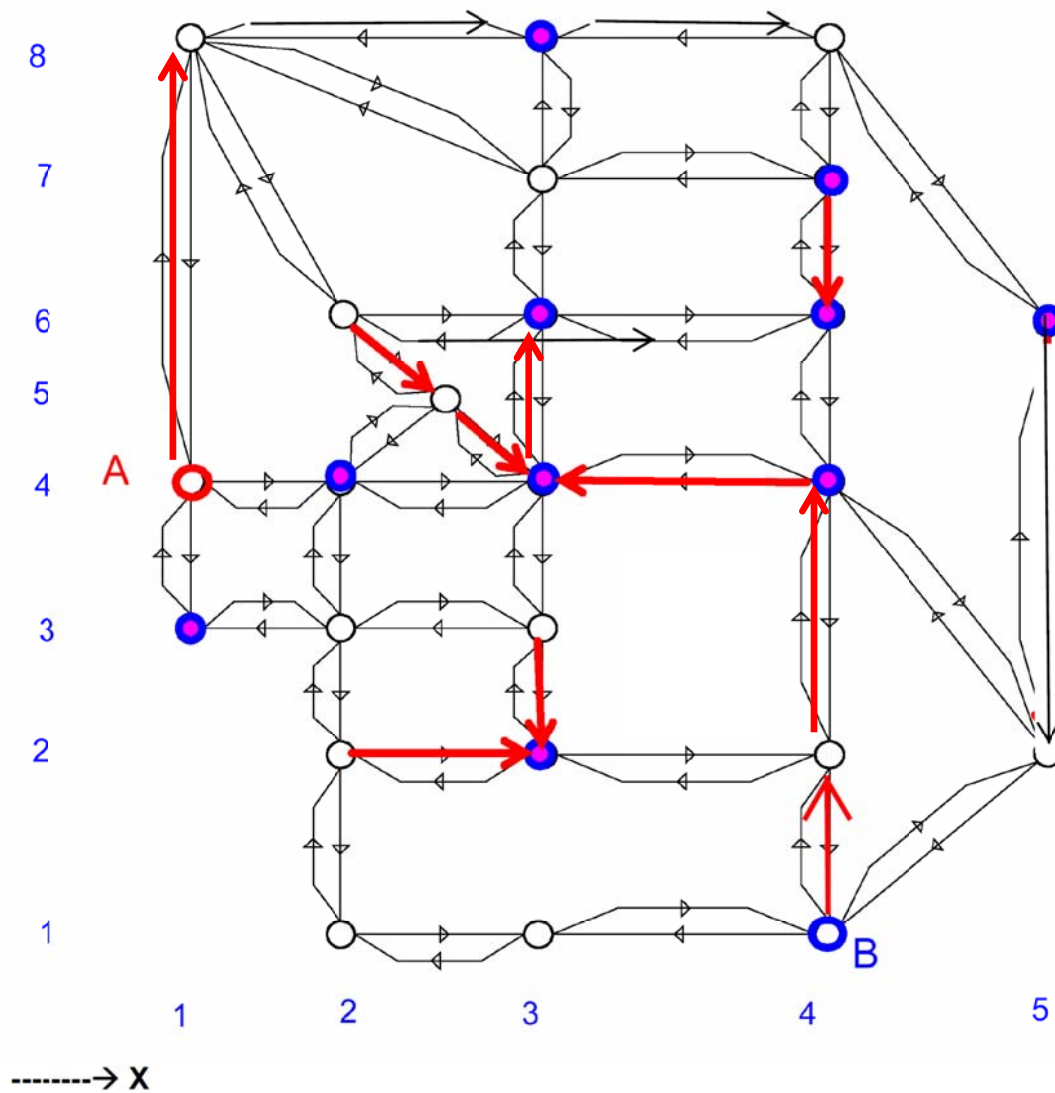
Adopt as investment costs  $f_{ij} = 15 \cdot (3|x_i - x_j| + |y_i - y_j|)$ ,  $(i,j) \in \hat{A}$



Links in red are the candidate set of links  $\hat{A}$  which can be added to the network. Nodes A,B are the origins of flows. Blue nodes marked with pink circle in the center are destinations for flows originating at nodes A and B. Assign to each node in the network coordinates as marked with the figures in blue on the x and y axis. Assume that each origin generates to each of the corresponding destinations 5 units of flow

Adopt as exploitation costs  $c_{i,j}$  of each link:  $c_{i,j} = 10 + ((x_i - x_j)^2 + (y_i - y_j)^2)^{3/2}$ ,  $(i,j) \in AU\hat{A}$

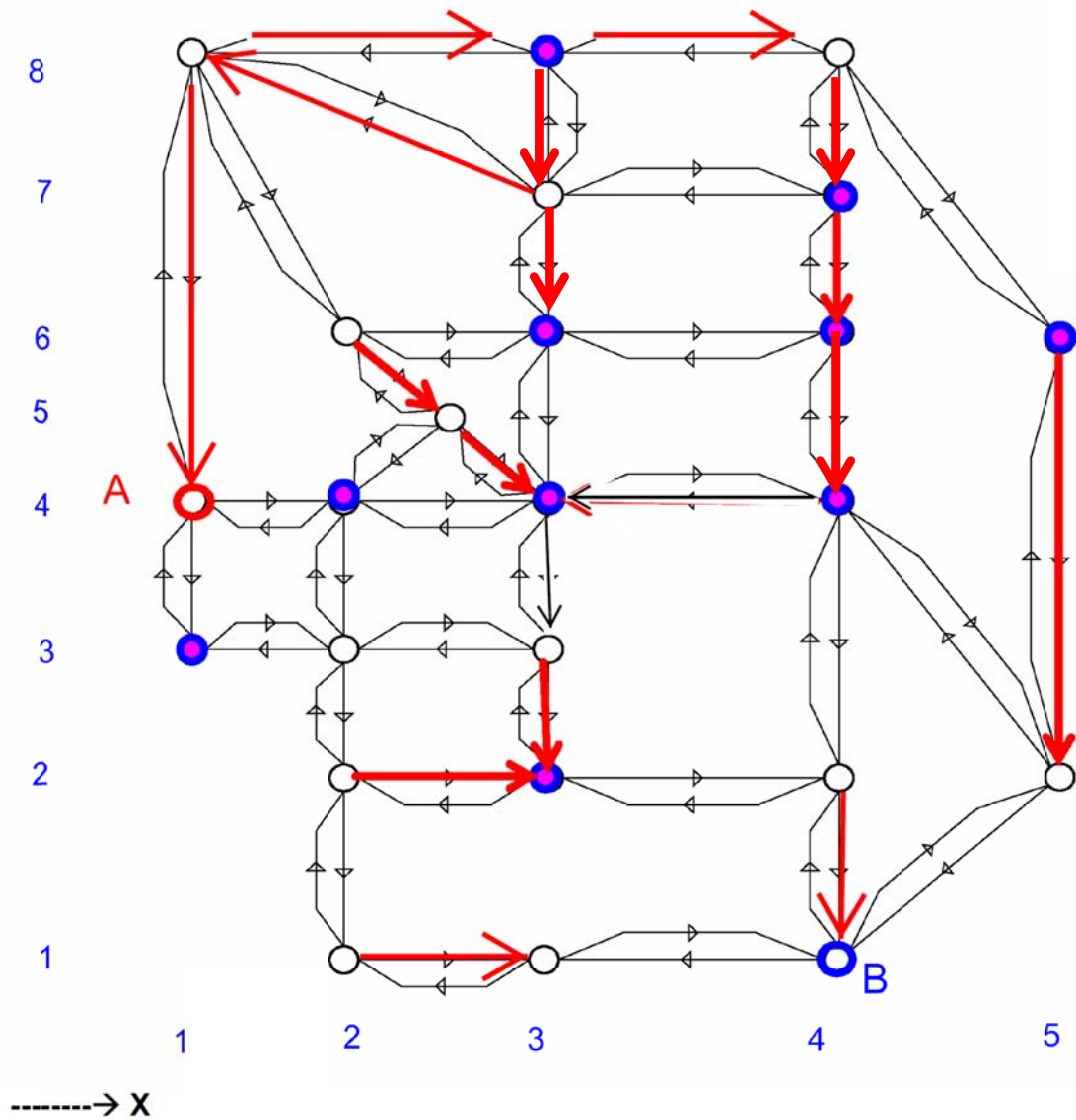
Adopt as investment costs  $f_{ij} = 2 * (|x_i - x_j| + 5|y_i - y_j|)$ ,  $(i,j) \in \hat{A}$



Links in red are the candidate set of links  $\hat{A}$  which can be added to the network. Nodes A,B are the origins of flows. Blue nodes marked with pink circle in the center are destinations for flows originating at nodes A and B. Assign to each node in the network coordinates as marked with the figures in blue on the x and y axis. Assume that each origin generates to each of the corresponding destinations 15 units of flow

Adopt as exploitation costs  $c_{ij}$  of each link:  $c_{ij} = 95 * ((x_i - x_j)^2 + 1.5(y_i - y_j)^2)$ ,  $(i,j) \in AU\hat{A}$

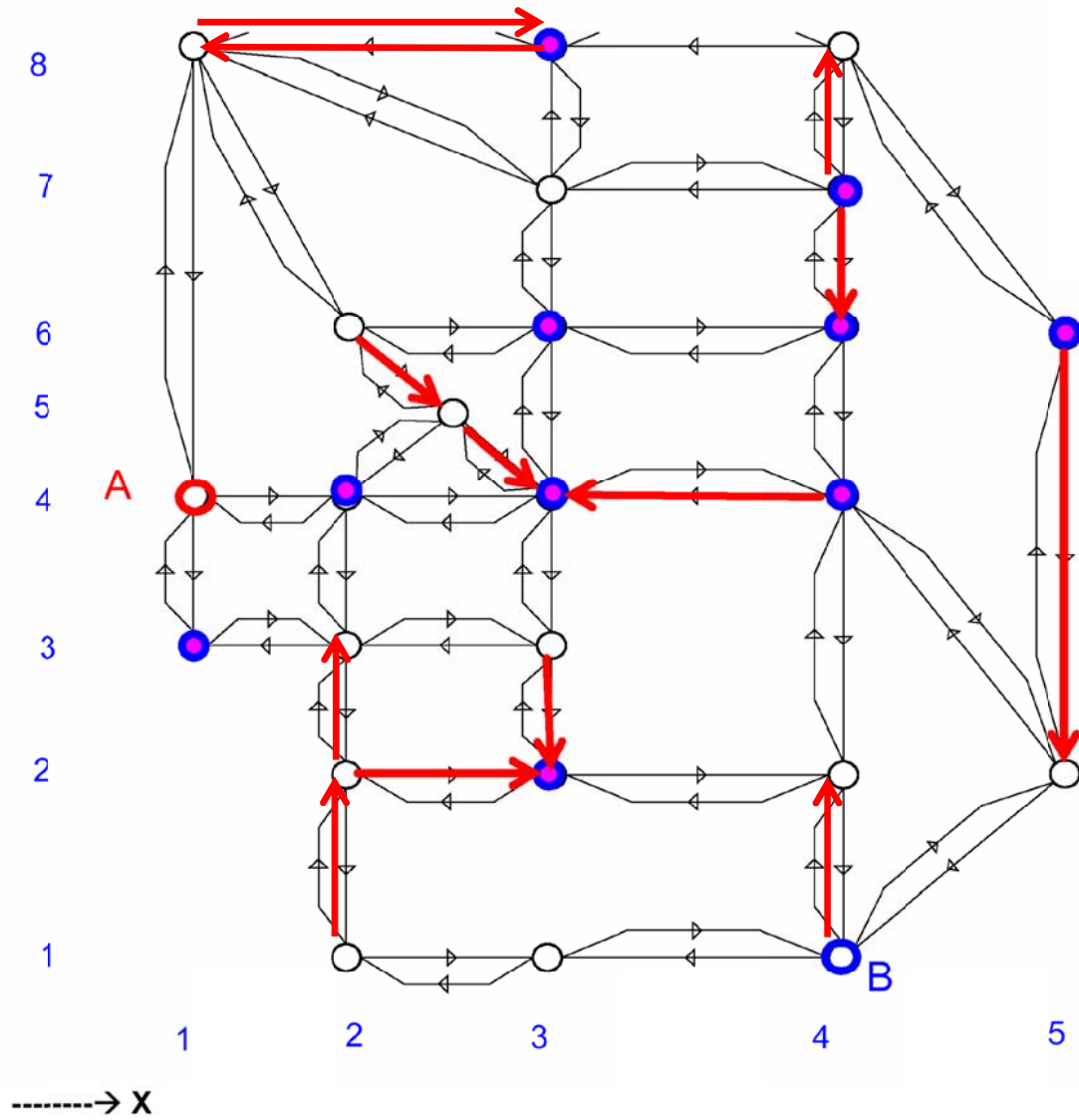
Adopt as investment costs  $f_{ij} = 10 * (|x_i - x_j| + |y_i - y_j|)$ ,  $(i,j) \in \hat{A}$



Links in red are the candidate set of links  $\hat{A}$  which can be added to the network. Nodes A,B are the origins of flows. Blue nodes marked with pink circle in the center are destinations for flows originating at nodes A and B. Assign to each node in the network coordinates as marked with the figures in blue on the x and y axis. Assume that each origin generates to each of the corresponding destinations 20 units of flow

Adopt as exploitation costs  $c_{i,j}$  of each link:  $c_{i,j} = 80 + (x_i - x_j)^{3/2} + (y_i - y_j)^2$ ,  $(i,j) \in AU\hat{A}$

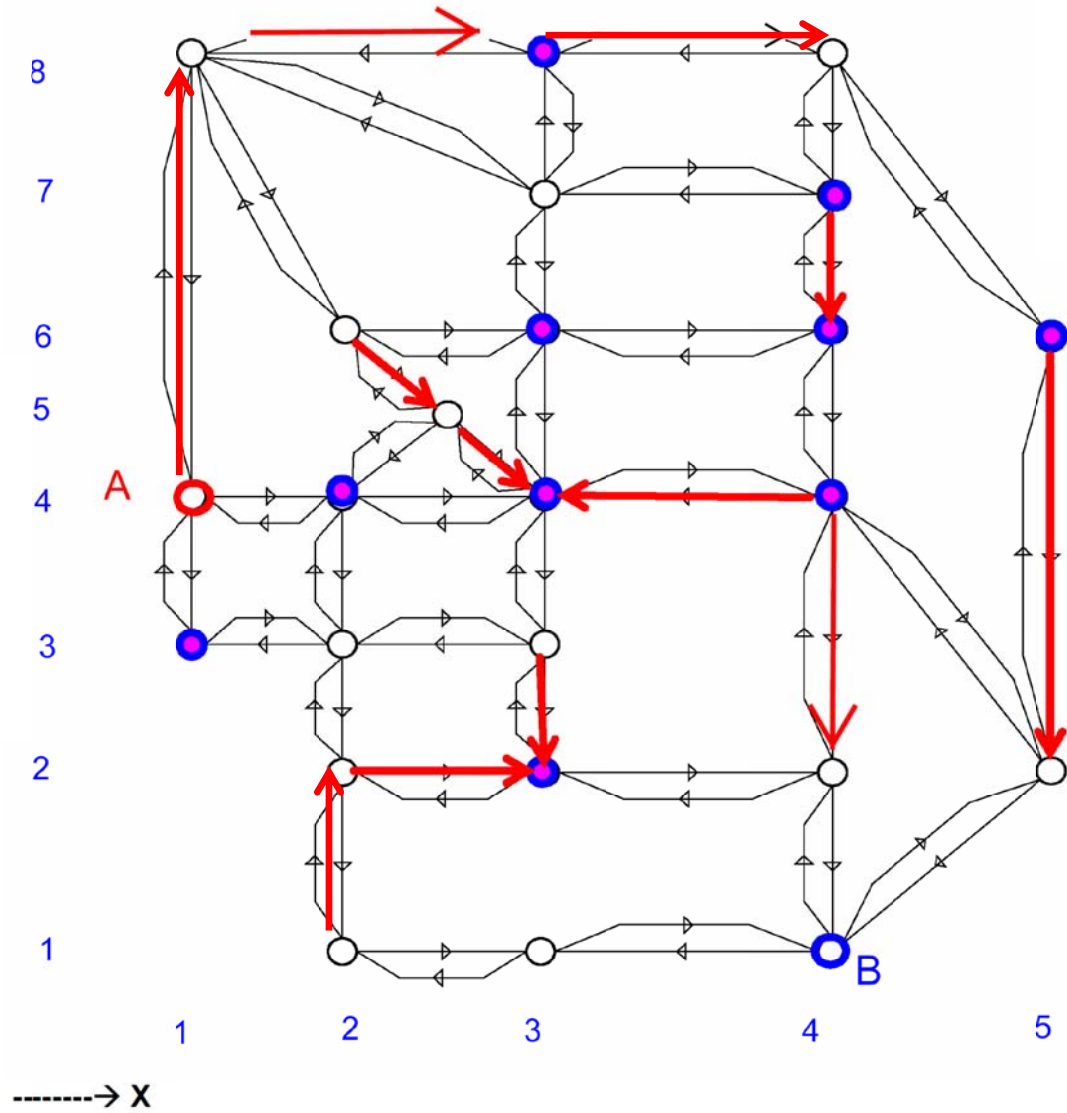
Adopt as investment costs  $f_{ij} = 30 * (|x_i - x_j| + |y_i - y_j|)^2$ ,  $(i,j) \in \hat{A}$



Links in red are the candidate set of links  $\hat{A}$  which can be added to the network. Nodes A,B are the origins of flows. Blue nodes marked with pink circle in the center are destinations for flows originating at nodes A and B. Assign to each node in the network coordinates as marked with the figures in blue on the x and y axis. Assume that each origin generates to each of the corresponding destinations 16 units of flow

Adopt as exploitation costs  $c_{i,j}$  of each link:  $c_{i,j} = 95 + (x_i - x_j)^2 + (y_i - y_j)^2$ ,  $(i,j) \in AU\hat{A}$

Adopt as investment costs  $f_{ij} = 25 * (0.5 |x_i - x_j| + 0.9 |y_i - y_j|)$ ,  $(i,j) \in \hat{A}$

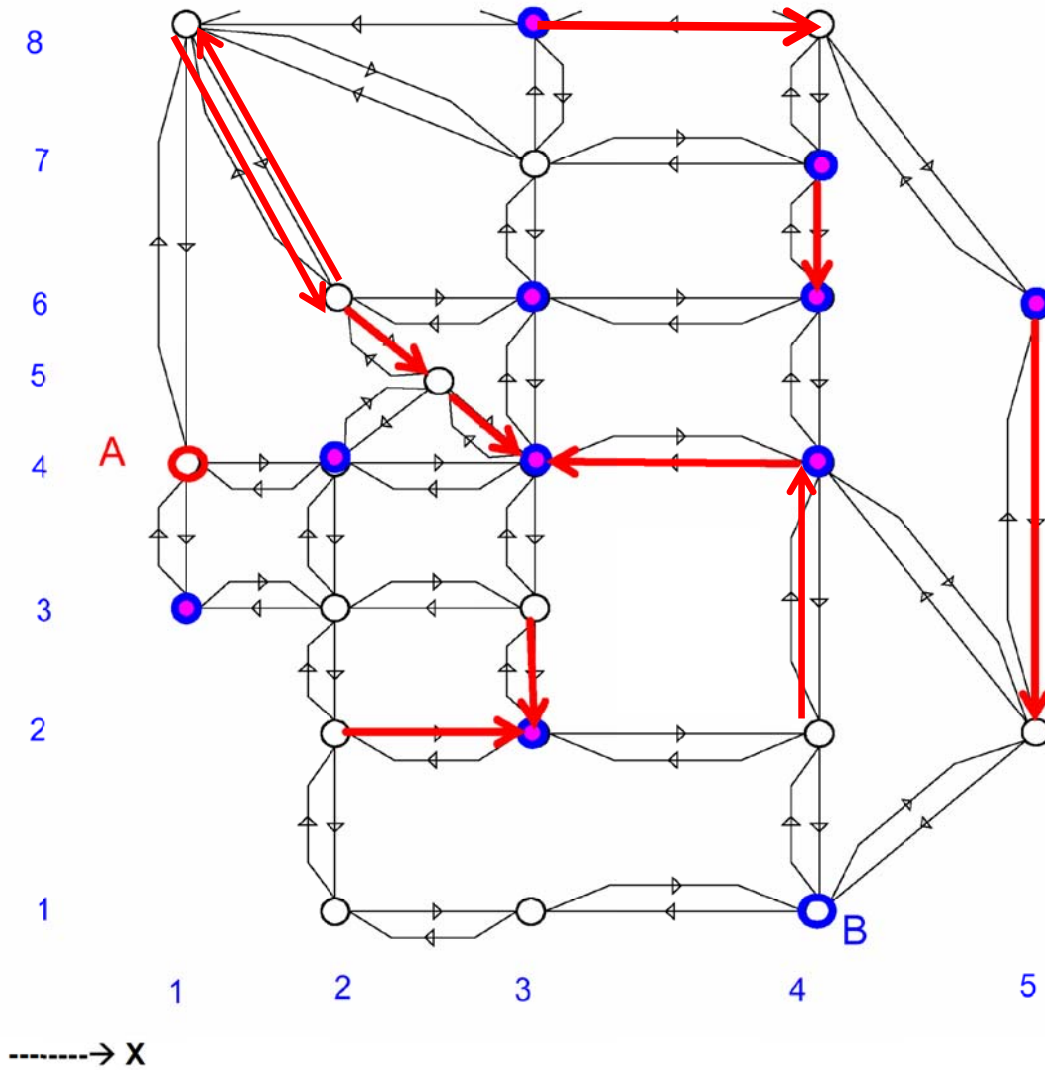


Links in red are the candidate set of links  $\hat{A}$  which can be added to the network. Nodes A,B are the origins of flows. Blue nodes marked with pink circle in the center are destinations for flows originating at nodes A and B. Assign to each node in the network coordinates as marked with the figures in blue on the x and y axis. Assume that each origin generates to each of the corresponding destinations 100 units of flow

Adopt as exploitation costs  $c_{ij}$  of each link:  $c_{ij} = 10 \cdot \log(1 + (x_i - x_j)^2 + (y_i - y_j)^2)$ ,  $(i,j) \in A \cup \hat{A}$

Adopt as investment costs  $f_{ij} = 12 \cdot (3|x_i - x_j| + |y_i - y_j|)$ ,  $(i,j) \in \hat{A}$

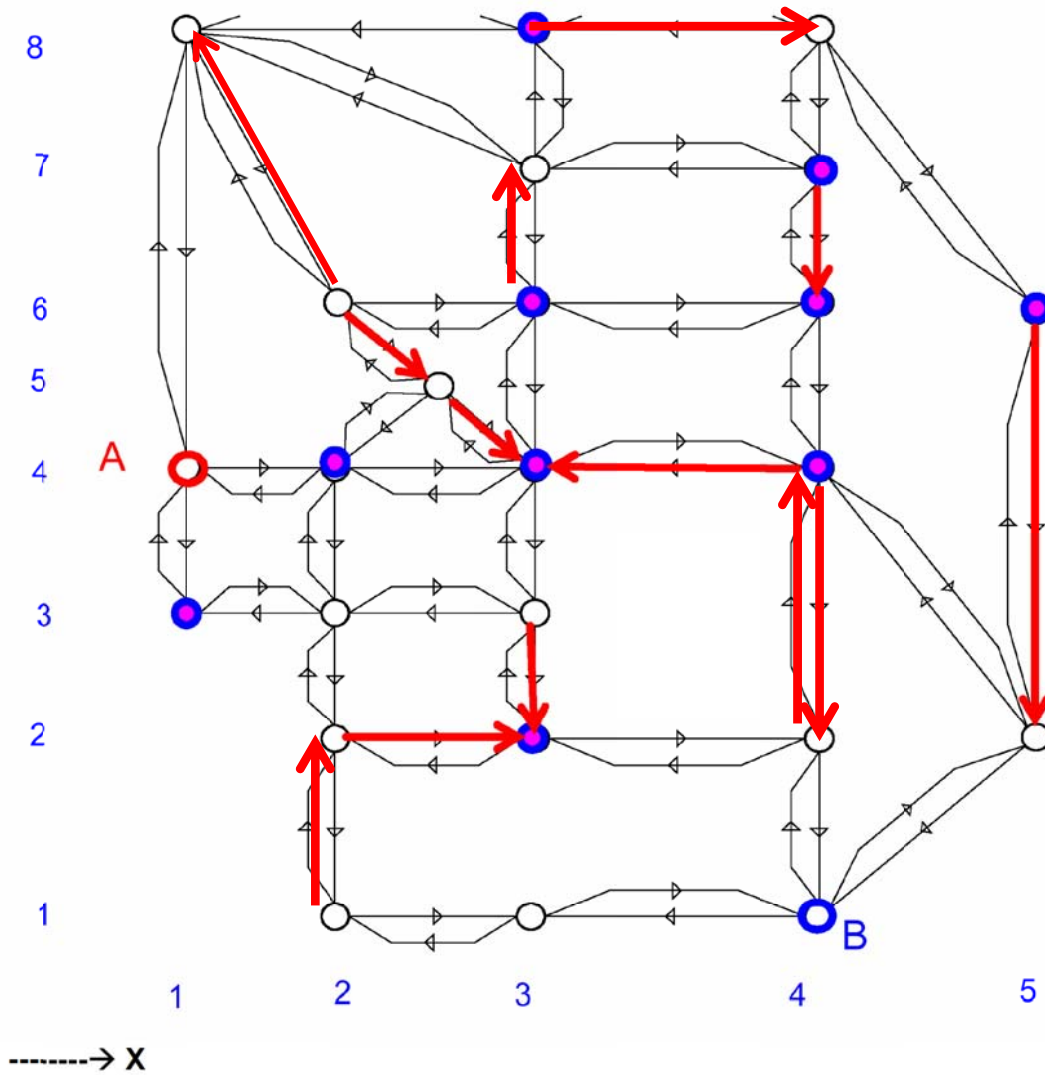




Links in red are the candidate set of links  $\hat{A}$  which can be added to the network. Nodes A,B are the origins of flows. Blue nodes marked with pink circle in the center are destinations for flows originating at nodes A and B. Assign to each node in the network coordinates as marked with the figures in blue on the x and y axis. Assume that each origin generates to each of the corresponding destinations 10 units of flow

Adopt as exploitation costs  $c_{i,j}$  of each link:  $c_{i,j} = 35 + (x_i - 2x_j)^2 + (2y_i - y_j)^2$ ,  $(i,j) \in AU\hat{A}$

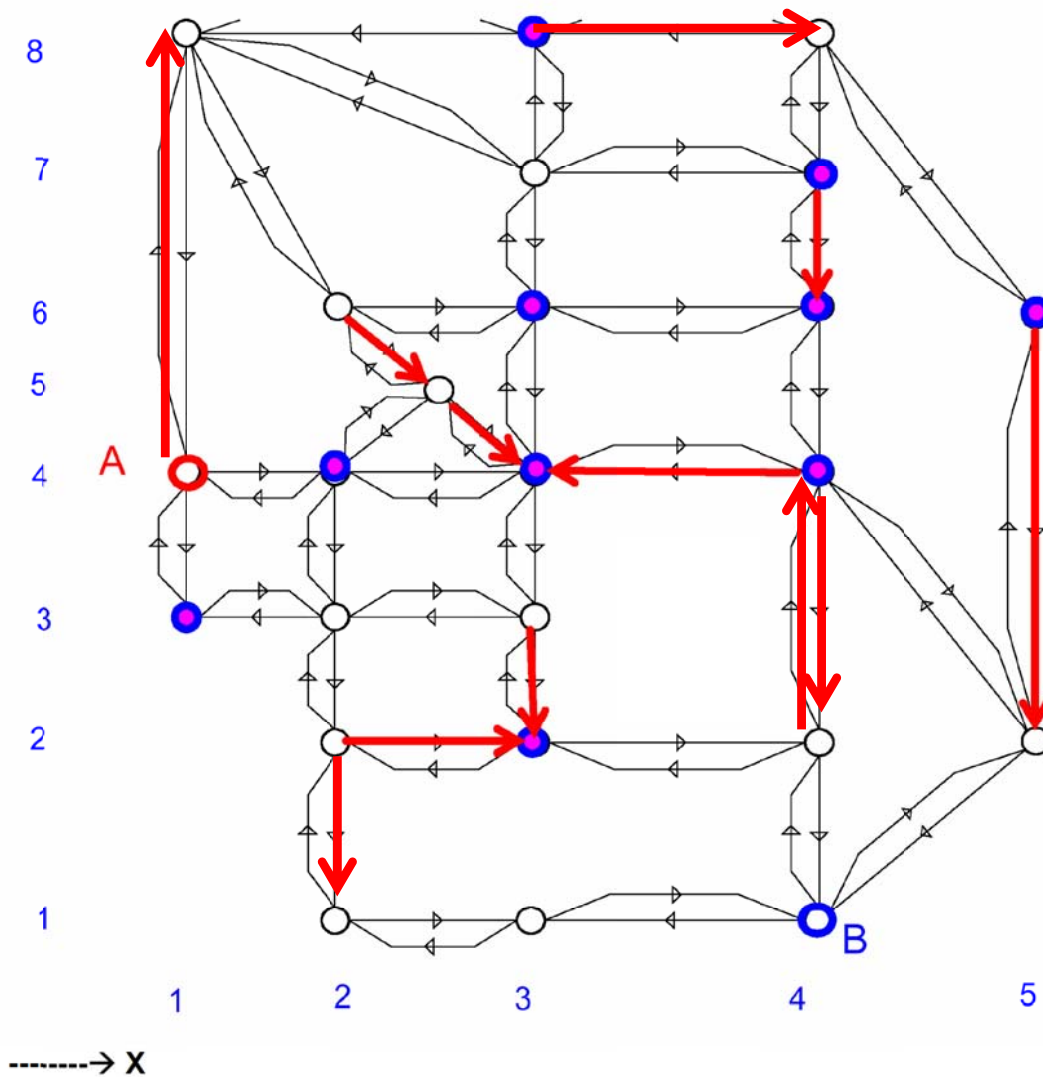
Adopt as investment costs  $f_{ij} = 2 \cdot (5|x_i - x_j| + 4|y_i - y_j|)$ ,  $(i,j) \in \hat{A}$



Links in red are the candidate set of links  $\hat{A}$  which can be added to the network. Nodes A,B are the origins of flows. Blue nodes marked with pink circle in the center are destinations for flows originating at nodes A and B. Assign to each node in the network coordinates as marked with the figures in blue on the x and y axis. Assume that each origin generates to each of the corresponding destinations 50 units of flow

Adopt as exploitation costs  $c_{i,j}$  of each link:  $c_{i,j} = 65 + (x_i - x_j)^2 + 4(y_i - y_j)^2$ ,  $(i,j) \in AU\hat{A}$

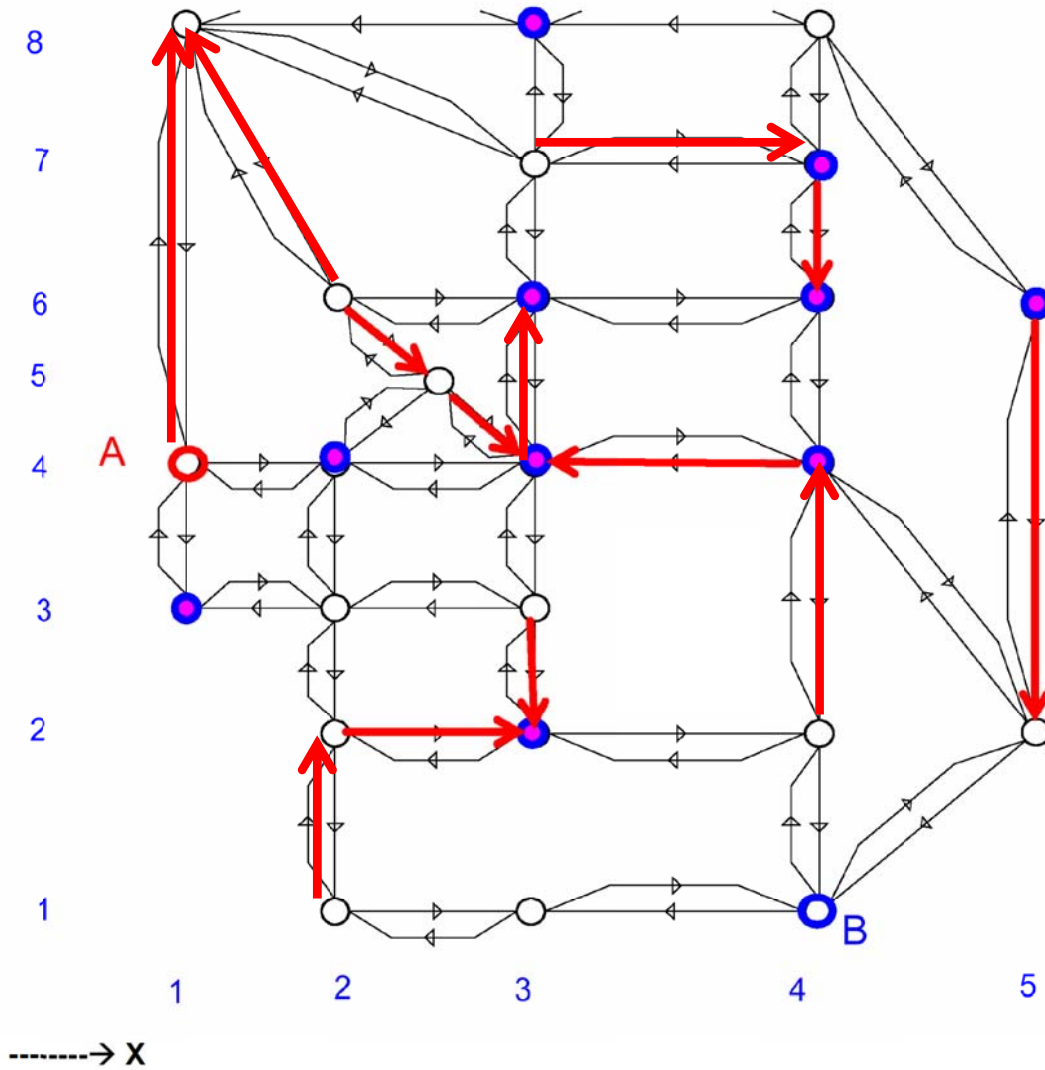
Adopt as investment costs  $f_{ij} = 100 * \sin(|x_i - x_j| + |y_i - y_j|)$ ,  $(i,j) \in \hat{A}$



Links in red are the candidate set of links  $\hat{A}$  which can be added to the network. Nodes A,B are the origins of flows. Blue nodes marked with pink circle in the center are destinations for flows originating at nodes A and B. Assign to each node in the network coordinates as marked with the figures in blue on the x and y axis. Assume that each origin generates to each of the corresponding destinations 120 units of flow

Adopt as exploitation costs  $c_{i,j}$  of each link:  $c_{i,j} = 100 + (x_i - x_j)^2 + (2y_i - y_j)^2$ ,  $(i,j) \in AU\hat{A}$

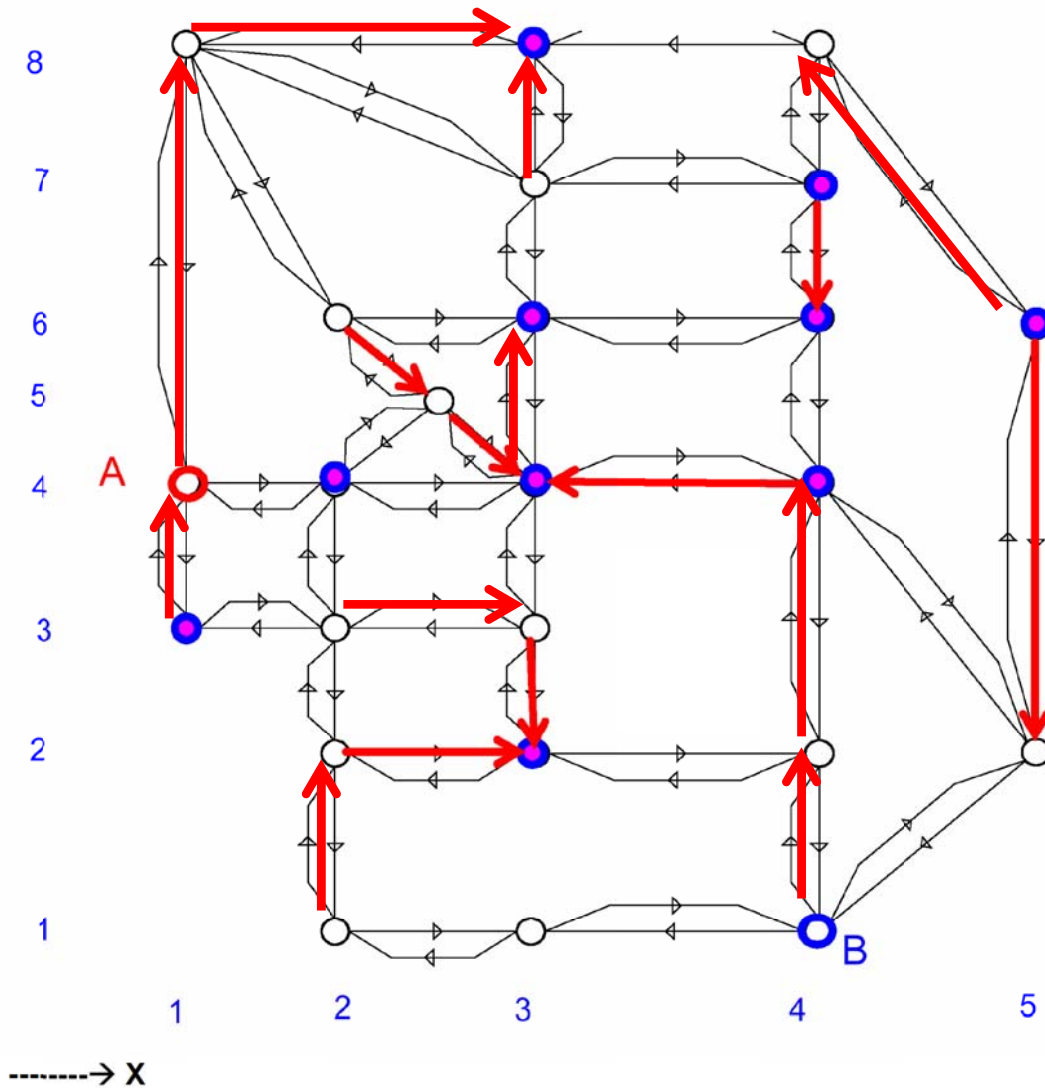
Adopt as investment costs  $f_{ij} = 10 * (|x_i - x_j| + |y_i - y_j|)$ ,  $(i,j) \in \hat{A}$



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Adopt as exploitation costs  $c_{i,j}$  of each link:  $c_{i,j} = 55 \cdot (5(x_i - x_j)^2 + (y_i - y_j)^2)$ ,  $(i,j) \in AU\hat{A}$

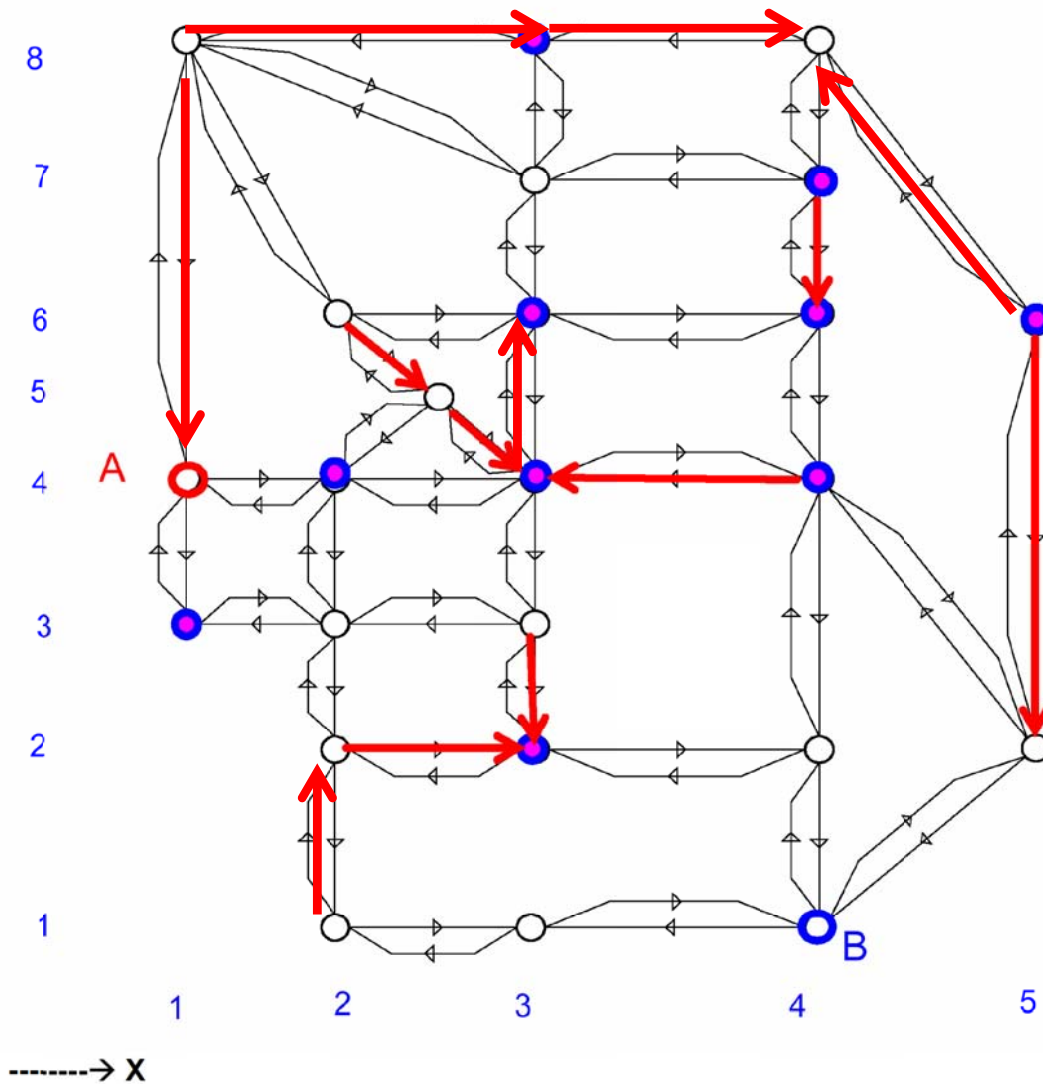
Adopt as investment costs  $f_{ij} = 10 \cdot (|x_i - x_j| + |y_i - y_j|)$ ,  $(i,j) \in \hat{A}$



Links in red are the candidate set of links  $\hat{A}$  which can be added to the network. Nodes A,B are the origins of flows. Blue nodes marked with pink circle in the center are destinations for flows originating at nodes A and B. Assign to each node in the network coordinates as marked with the figures in blue on the x and y axis. Assume that each origin generates to each of the corresponding destinations 10 units of flow

Adopt as exploitation costs  $c_{i,j}$  of each link:  $c_{i,j} = 9 + 15 + 4(x_i - x_j)^2 + (y_i - y_j)^2$ ,  $(i,j) \in AU\hat{A}$

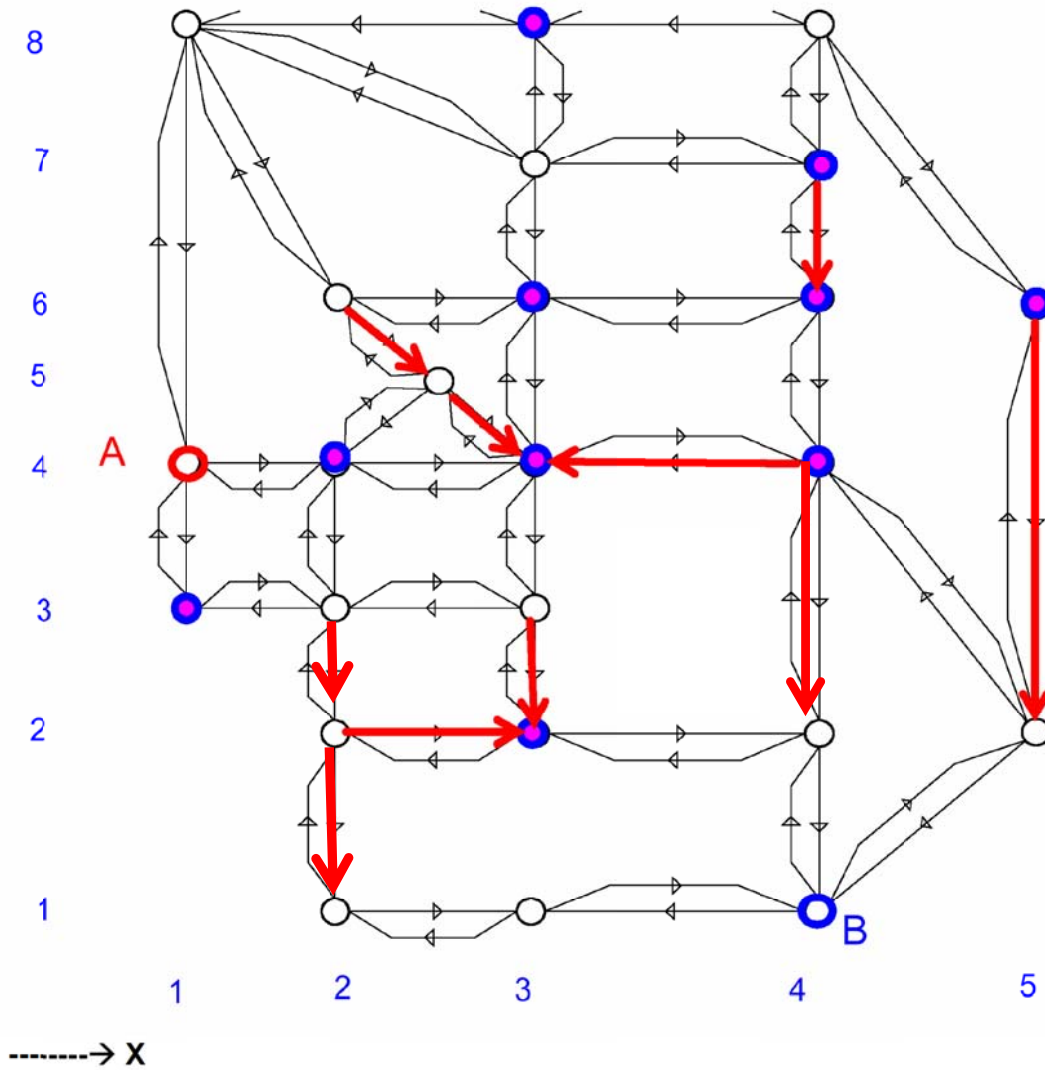
Adopt as investment costs  $f_{ij} = 10 \cdot (3|x_i - x_j| + 4|y_i - y_j|)$ ,  $(i,j) \in \hat{A}$



Links in red are the candidate set of links  $\hat{A}$  which can be added to the network. Nodes A,B are the origins of flows. Blue nodes marked with pink circle in the center are destinations for flows originating at nodes A and B. Assign to each node in the network coordinates as marked with the figures in blue on the x and y axis. Assume that each origin generates to each of the corresponding destinations 90 units of flow

Adopt as exploitation costs  $c_{i,j}$  of each link:  $c_{i,j} = 95 + (x_i - x_j)^2 + (y_i - y_j)^2$ ,  $(i,j) \in AU\hat{A}$

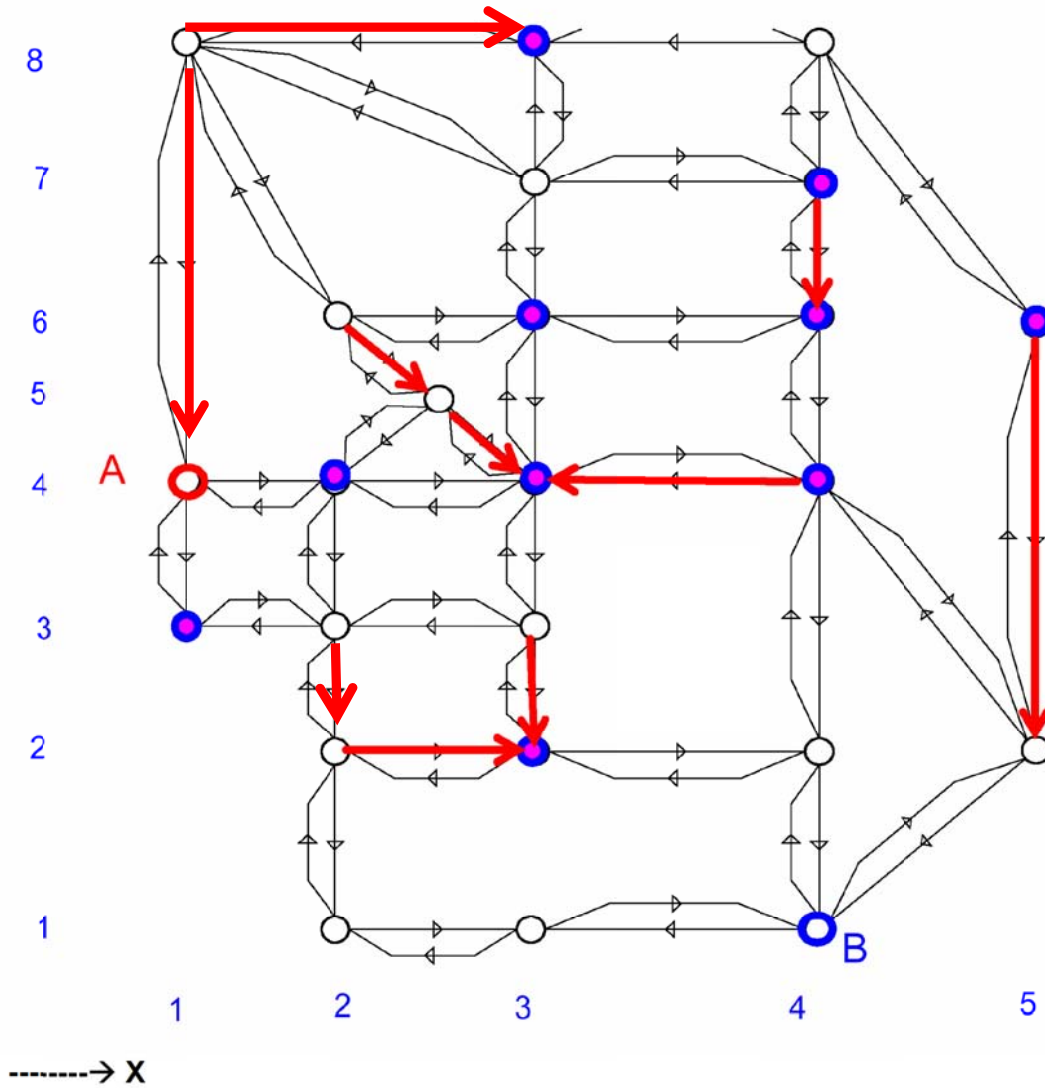
Adopt as investment costs  $f_{ij} = 100 * (0.5 |x_i - x_j| + 0.1 |y_i - y_j|)$ ,  $(i,j) \in \hat{A}$



Links in red are the candidate set of links  $\hat{A}$  which can be added to the network. Nodes A,B are the origins of flows. Blue nodes marked with pink circle in the center are destinations for flows originating at nodes A and B. Assign to each node in the network coordinates as marked with the figures in blue on the x and y axis. Assume that each origin generates to each of the corresponding destinations 70 units of flow

Adopt as exploitation costs  $c_{i,j}$  of each link:  $c_{i,j} = 25 + 5(x_i - x_j)^2 + (y_i - y_j)^2$ ,  $(i,j) \in AU\hat{A}$

Adopt as investment costs  $f_{ij} = 50 * (|x_i - x_j| + 7|y_i - y_j|)$ ,  $(i,j) \in \hat{A}$

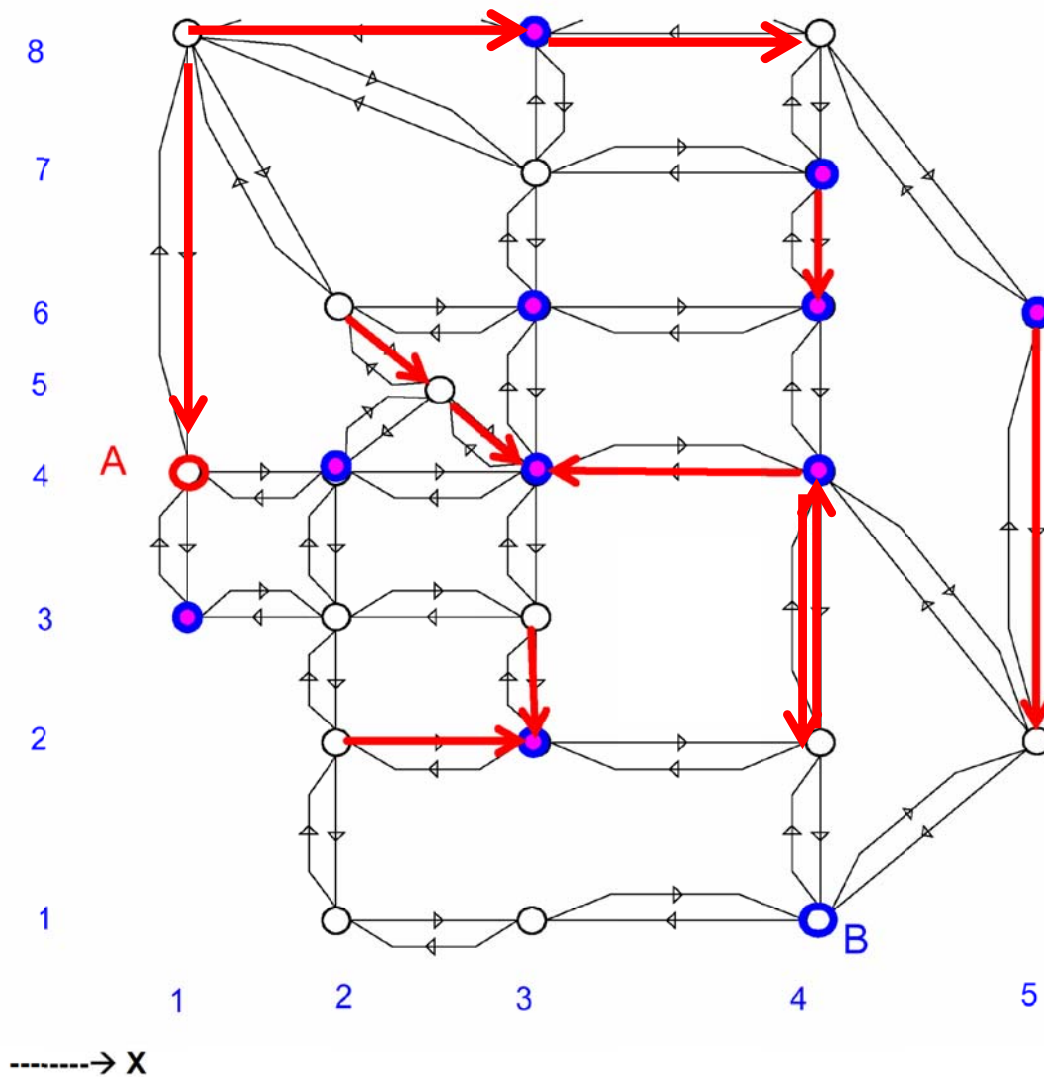


Links in red are the candidate set of links  $\hat{A}$  which can be added to the network. Nodes A,B are the origins of flows. Blue nodes marked with pink circle in the center are destinations for flows originating at nodes A and B. Assign to each node in the network coordinates as marked with the figures in blue on the x and y axis. Assume that each origin generates to each of the corresponding destinations 10 units of flow

Adopt as exploitation costs  $c_{i,j}$  of each link:  $c_{i,j} = 95 \cdot (x_i - x_j)^2 + 45(y_i - y_j)^2$ ,  $(i,j) \in AU\hat{A}$

Adopt as investment costs  $f_{ij} = 10 \cdot (4|x_i - x_j| + |y_i - y_j|)$ ,  $(i,j) \in \hat{A}$

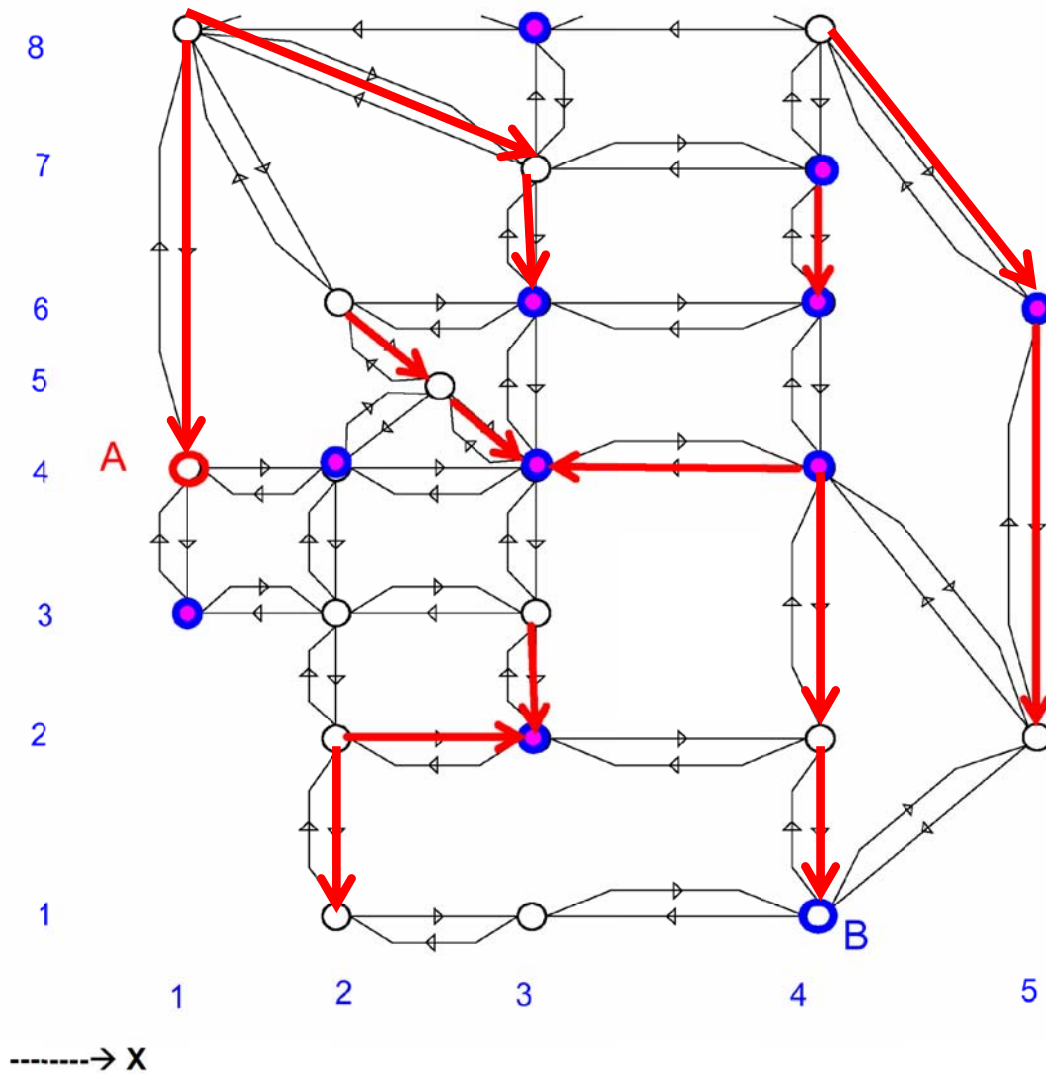




Links in red are the candidate set of links  $\hat{A}$  which can be added to the network. Nodes A,B are the origins of flows. Blue nodes marked with pink circle in the center are destinations for flows originating at nodes A and B. Assign to each node in the network coordinates as marked with the figures in blue on the x and y axis. Assume that each origin generates to each of the corresponding destinations 130 units of flow

Adopt as exploitation costs  $c_{i,j}$  of each link:  $c_{i,j} = 20(x_i - x_j)^2 + 35(y_i - y_j)^2, (i,j) \in AU\hat{A}$

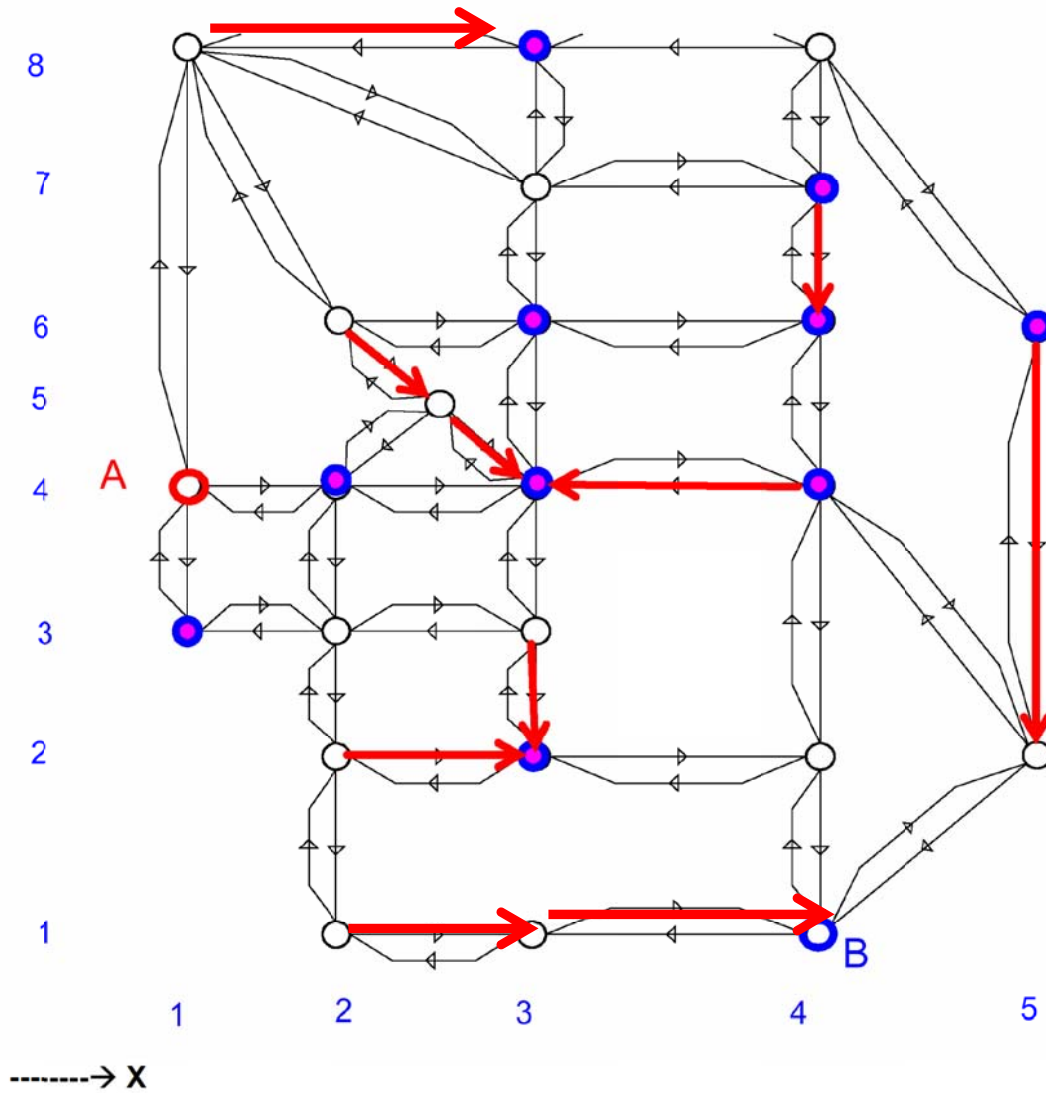
Adopt as investment costs  $f_{ij} = 150*(|x_i - x_j| + |y_i - y_j|), (i,j) \in \hat{A}$



Links in red are the candidate set of links  $\hat{A}$  which can be added to the network. Nodes A,B are the origins of flows. Blue nodes marked with pink circle in the center are destinations for flows originating at nodes A and B. Assign to each node in the network coordinates as marked with the figures in blue on the x and y axis. Assume that each origin generates to each of the corresponding destinations 10 units of flow

Adopt as exploitation costs  $c_{i,j}$  of each link:  $c_{i,j} = 95 + (x_i - x_j)^2 + (y_i - y_j)^2$ ,  $(i,j) \in AU\hat{A}$

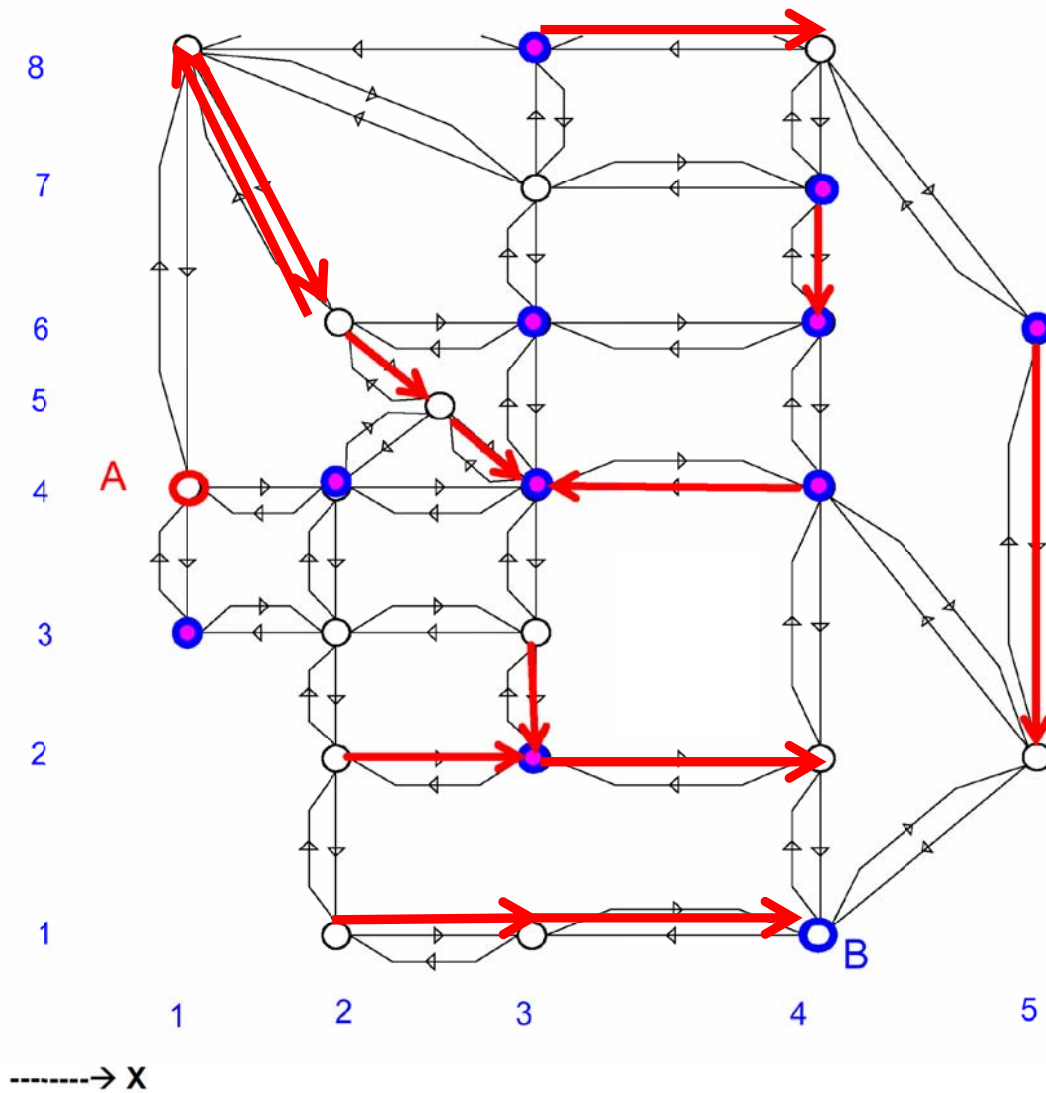
Adopt as investment costs  $f_{ij} = 10 * (|x_i - x_j| + |y_i - y_j|)$ ,  $(i,j) \in \hat{A}$



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Adopt as exploitation costs  $c_{i,j}$  of each link:  $c_{i,j} = 95 + (x_i - x_j)^2 + 8(y_i - y_j)^2, (i,j) \in AU\hat{A}$

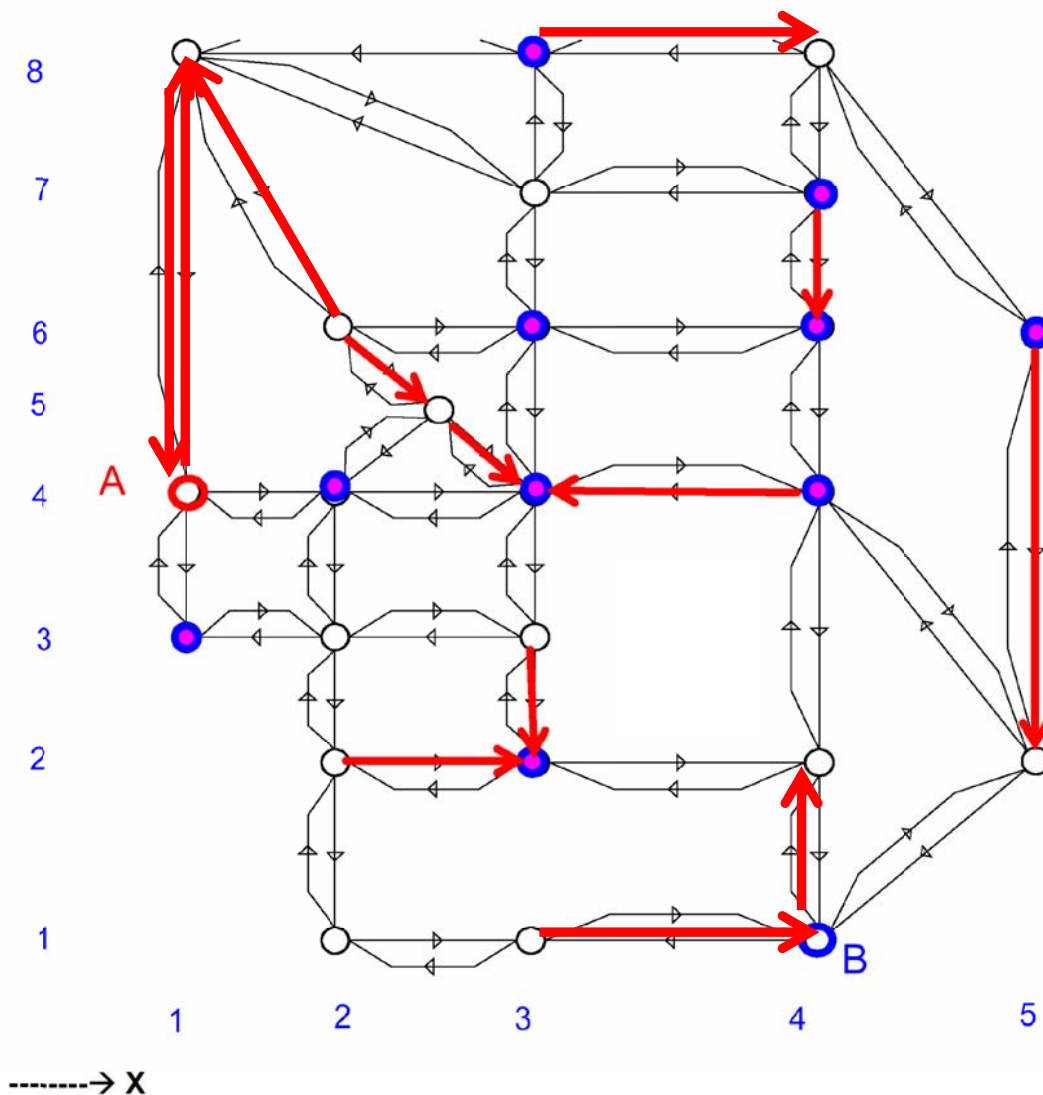
Adopt as investment costs  $f_{ij} = 10 * (|x_i - x_j| + 6|y_i - y_j|), (i,j) \in \hat{A}$



Links in red are the candidate set of links  $\hat{A}$  which can be added to the network. Nodes A,B are the origins of flows. Blue nodes marked with pink circle in the center are destinations for flows originating at nodes A and B. Assign to each node in the network coordinates as marked with the figures in blue on the x and y axis. Assume that each origin generates to each of the corresponding destinations 70 units of flow

Adopt as exploitation costs  $c_{ij}$  of each link:  $c_{ij} = 25(x_i - x_j)^2 + 50(y_i - y_j)^2, (i,j) \in AU\hat{A}$

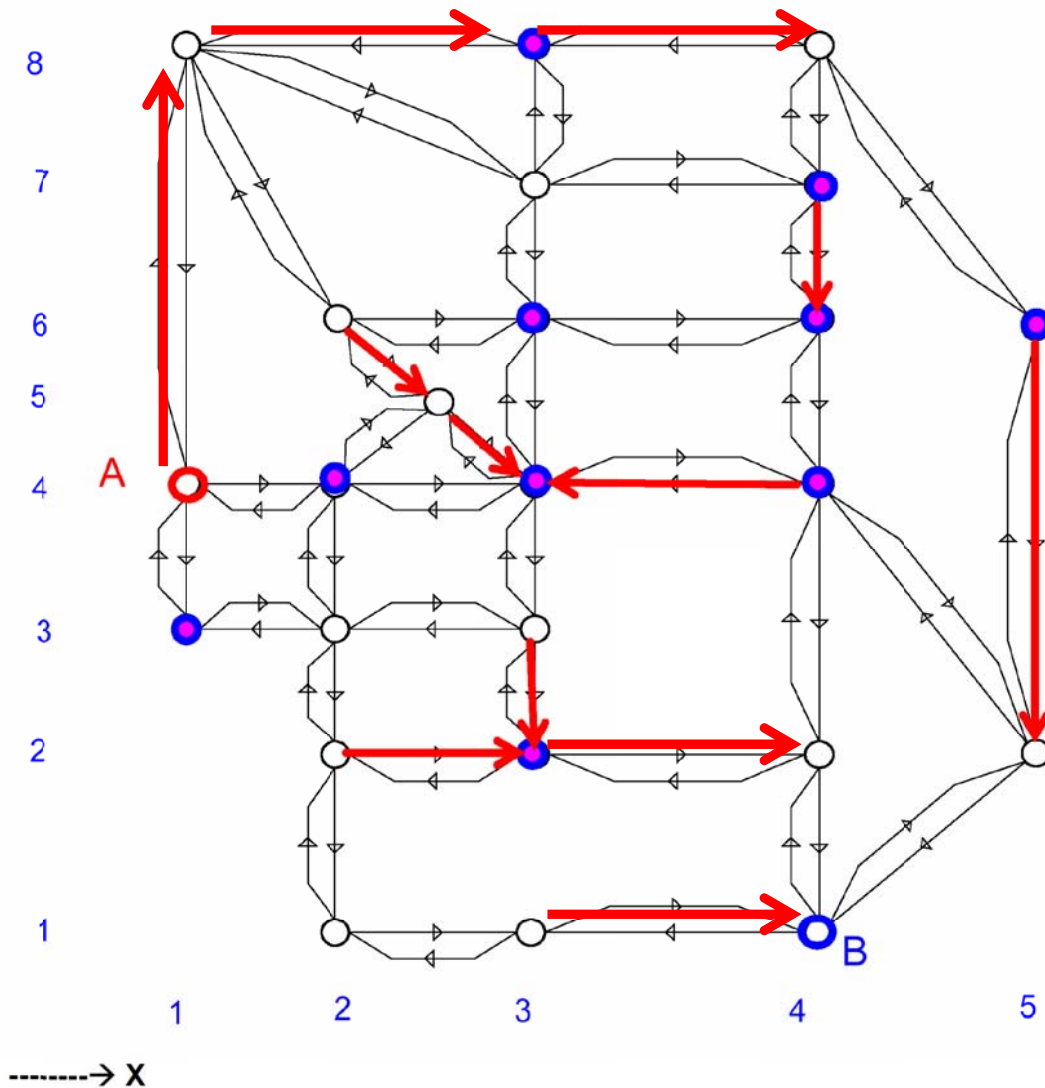
Adopt as investment costs  $f_{ij} = 15 \cdot (5|x_i - x_j| + 2|y_i - y_j|), (i,j) \in \hat{A}$



Links in red are the candidate set of links  $\hat{A}$  which can be added to the network. Nodes A,B are the origins of flows. Blue nodes marked with pink circle in the center are destinations for flows originating at nodes A and B. Assign to each node in the network coordinates as marked with the figures in blue on the x and y axis. Assume that each origin generates to each of the corresponding destinations 100 units of flow

Adopt as exploitation costs  $c_{ij}$  of each link:  $c_{ij} = 90(x_i - x_j)^2 + 30(y_i - y_j)^2, (i,j) \in AU\hat{A}$

Adopt as investment costs  $f_{ij} = 50 \cdot (3|x_i - x_j| + 2|y_i - y_j|), (i,j) \in \hat{A}$



Links in red are the candidate set of links  $\hat{A}$  which can be added to the network. Nodes A,B are the origins of flows. Blue nodes marked with pink circle in the center are destinations for flows originating at nodes A and B. Assign to each node in the network coordinates as marked with the figures in blue on the x and y axis. Assume that each origin generates to each of the corresponding destinations 25 units of flow

Adopt as exploitation costs  $c_{i,j}$  of each link:  $c_{i,j} = 15 + 4(x_i - x_j)^2 + 2(y_i - y_j)^2$ ,  $(i,j) \in AU\hat{A}$

Adopt as investment costs  $f_{ij} = 55 \cdot (3|x_i - x_j| + |y_i - y_j|)$ ,  $(i,j) \in \hat{A}$