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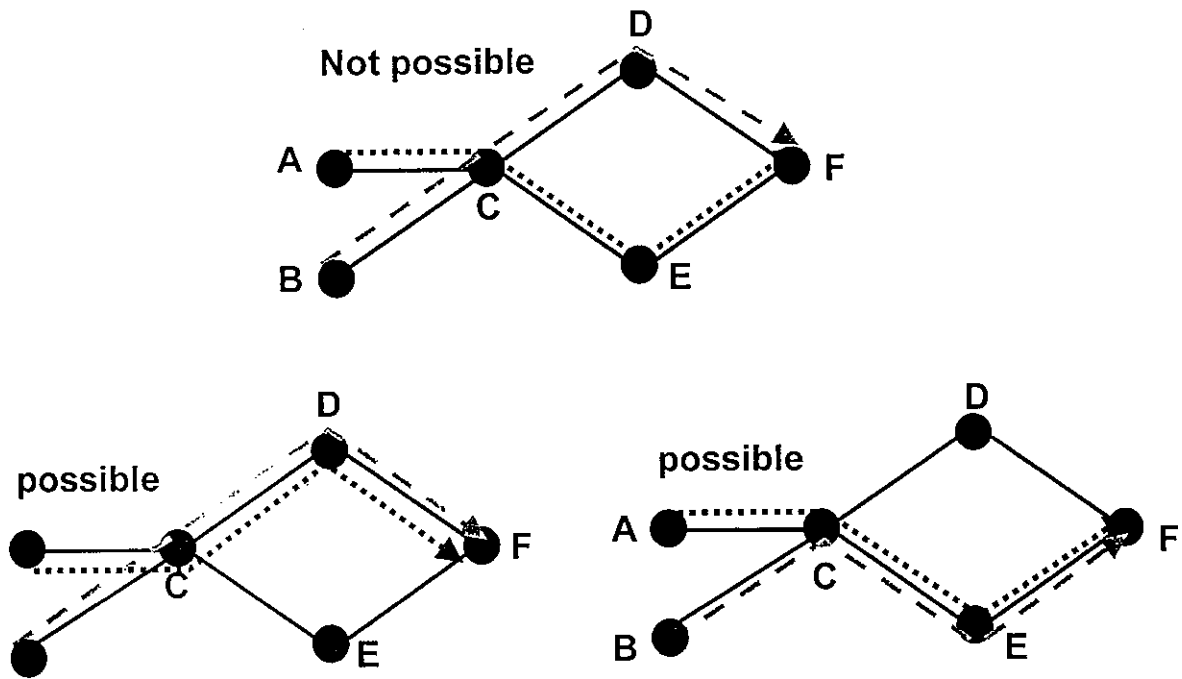


Figure 1: single path routing on data paths in a network

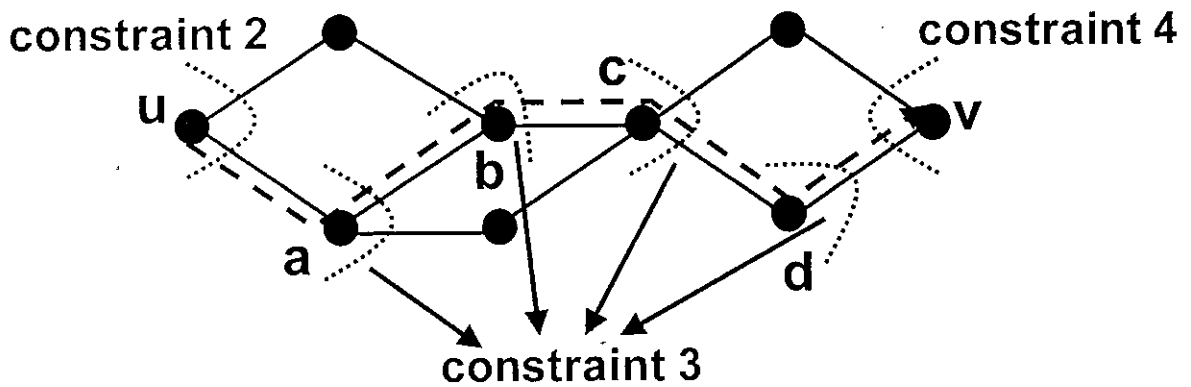
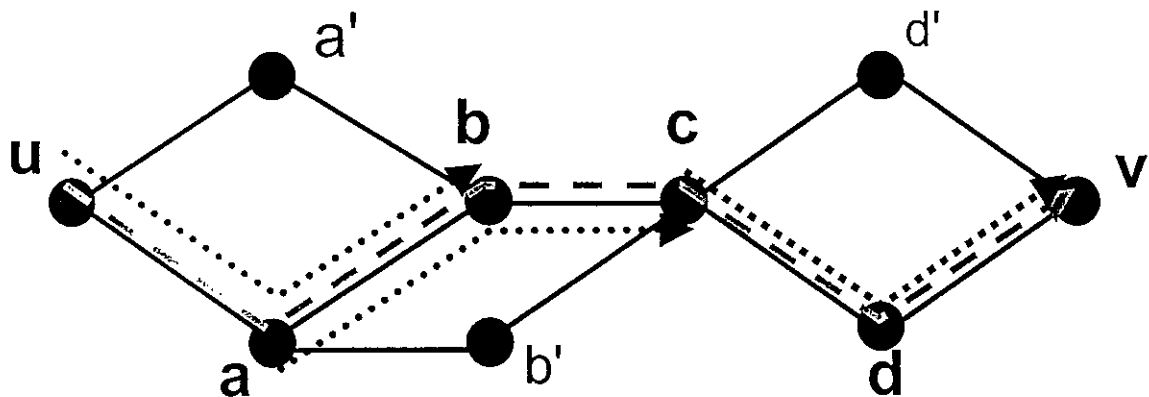


Figure 2: transport constraints on data paths in a network

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$$(u,v) \supset \{(a,v), (u,d)\}$$

$$(a,v) \supset \{(b,v), (a,d)\}$$

$$(b,v) \supset \{(c,v), (b,d)\}$$

$$(u,d) \supset \{(a,d), (u,c)\}$$

$$(u,c) \supset \{(a,c), (u,b)\}$$

$\Rightarrow (u,v)$ is routed on the same path as (c,v) , (u,c)

Figure 3: routing constraints according to the invention on data paths in a network

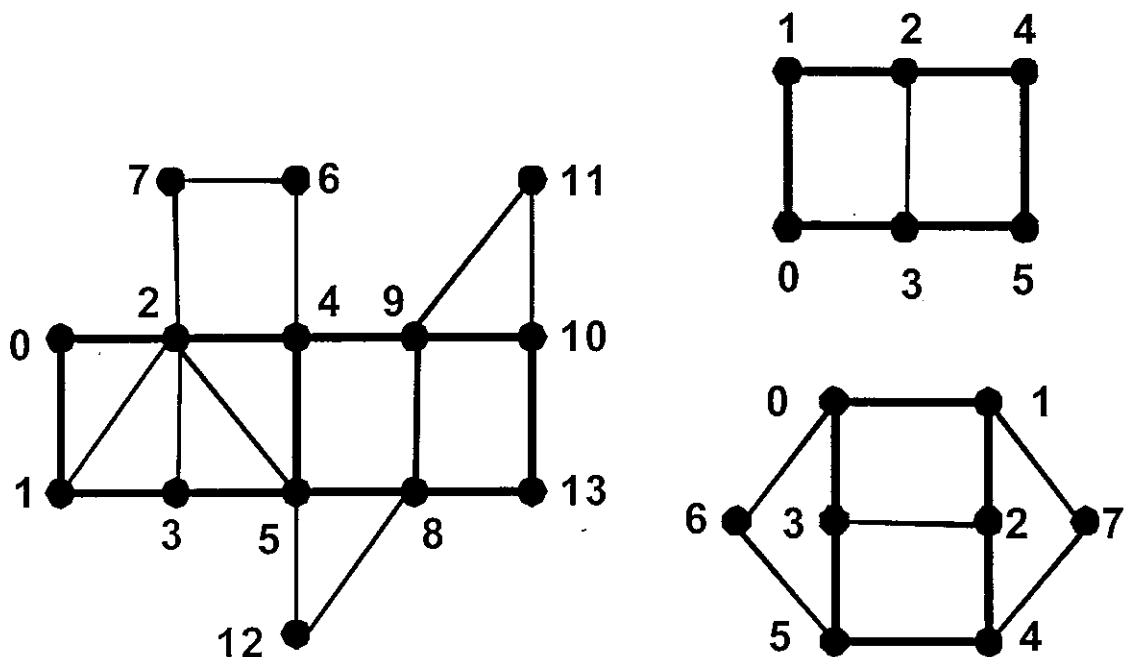


Figure 4: example networks with 6, 8 and 14 nodes/routers

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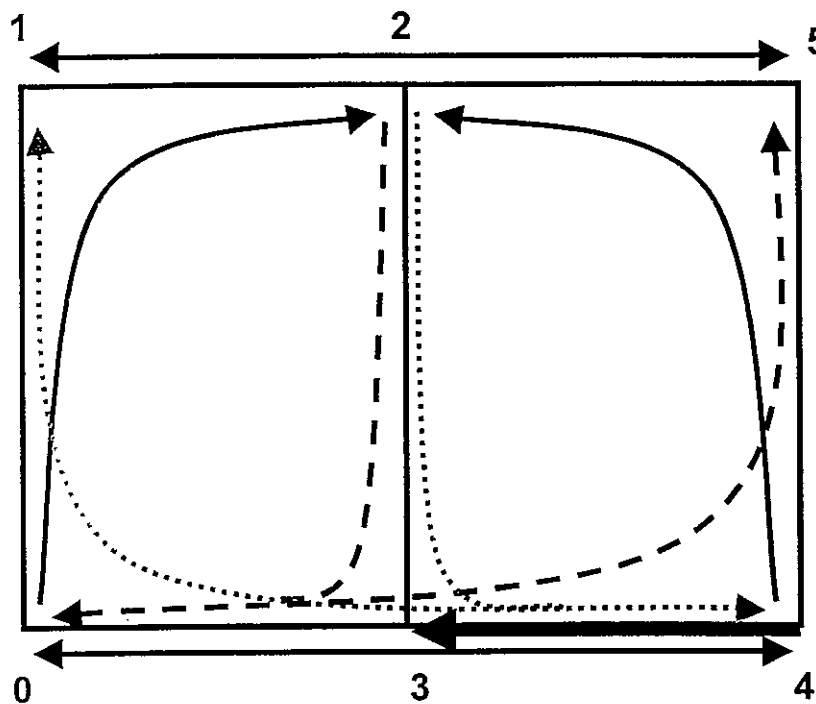


Figure 5: data routing according to the invention for minimized average link utilization

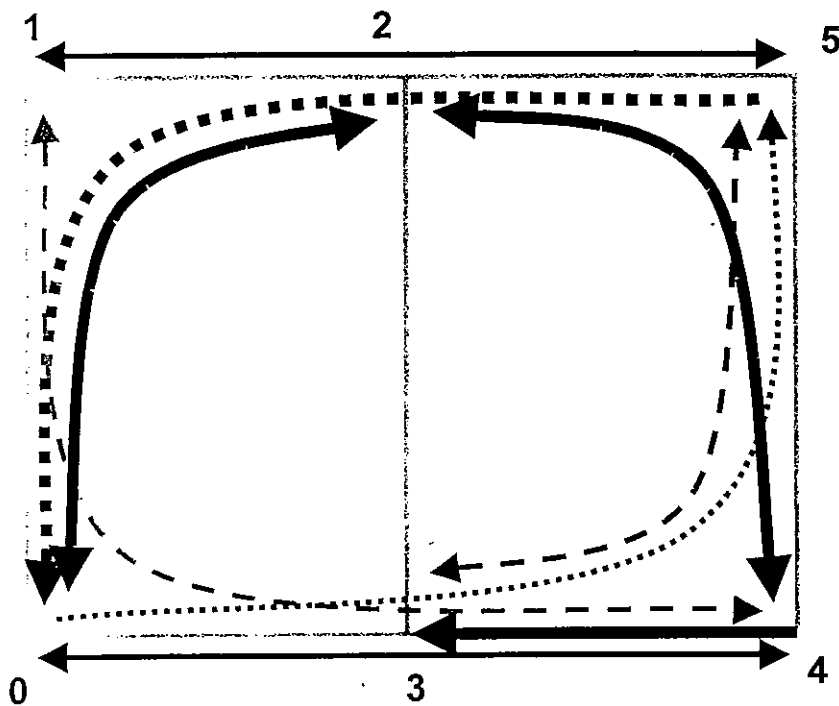


Figure 6: data routing according to the invention with minimized maximum link utilization

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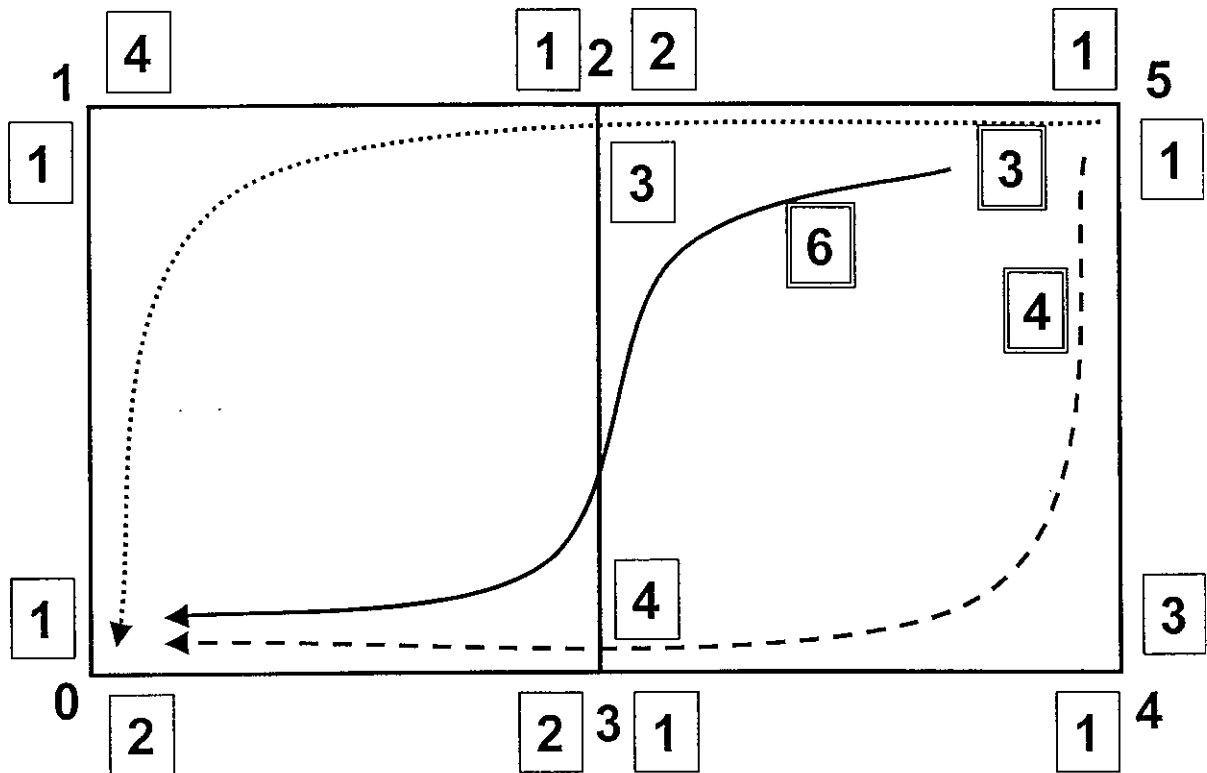


Figure 7: link costs with minimized maximum link utilization

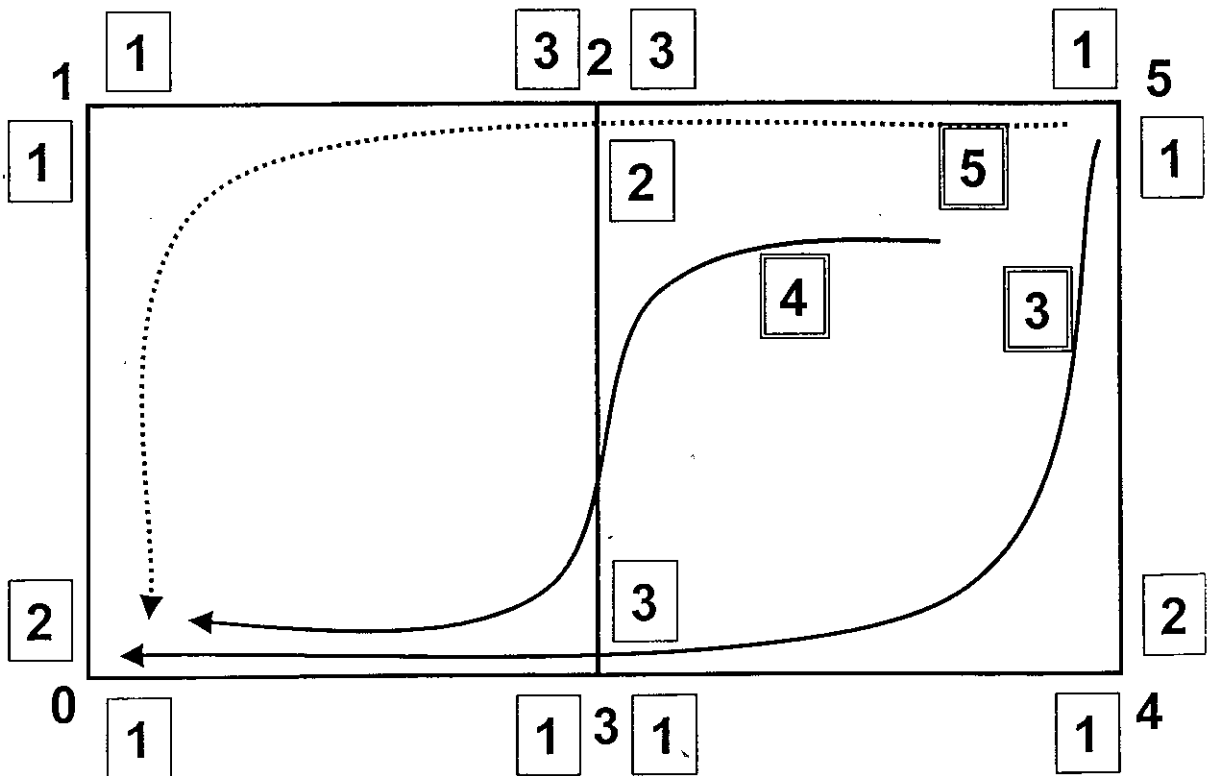


Figure 8: link costs with minimized maximum link utilization

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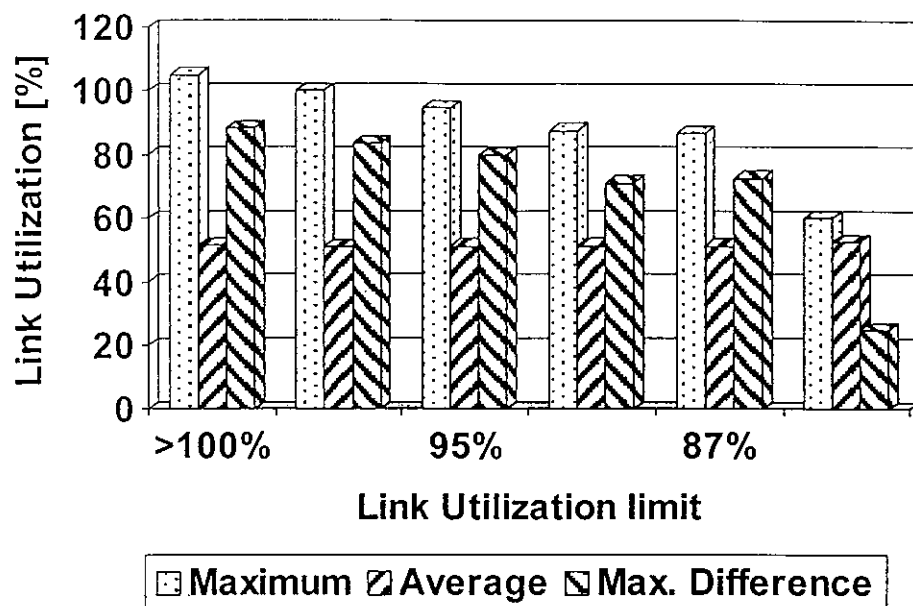


Figure 9: changes of link utilizations according for the invention for the 8 node network

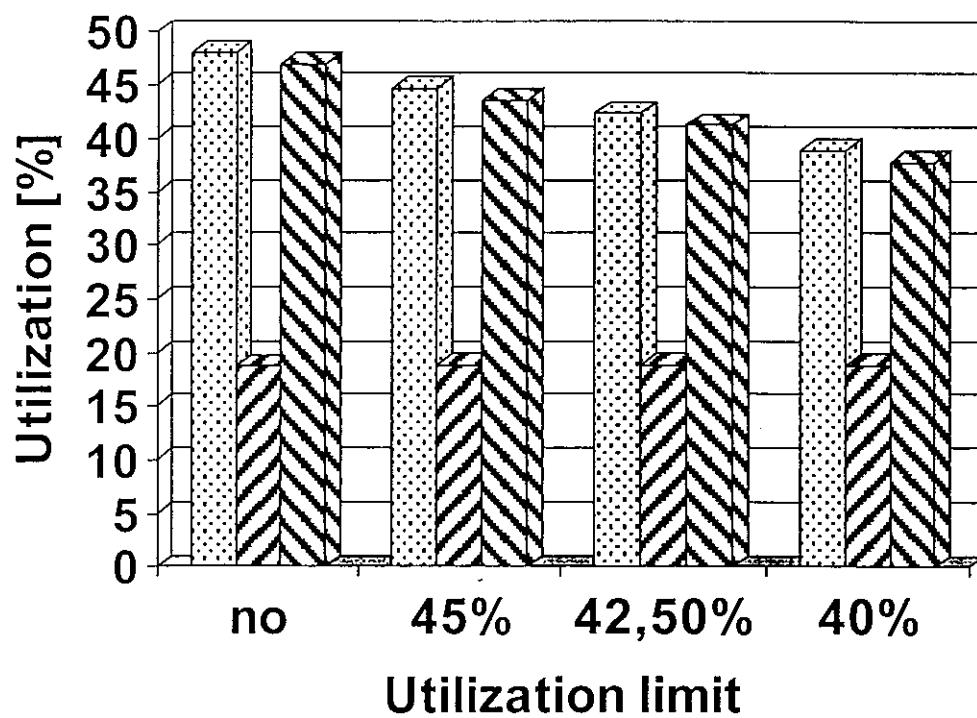


Figure 10: changes of link utilizations for selected data links of the 14 node network

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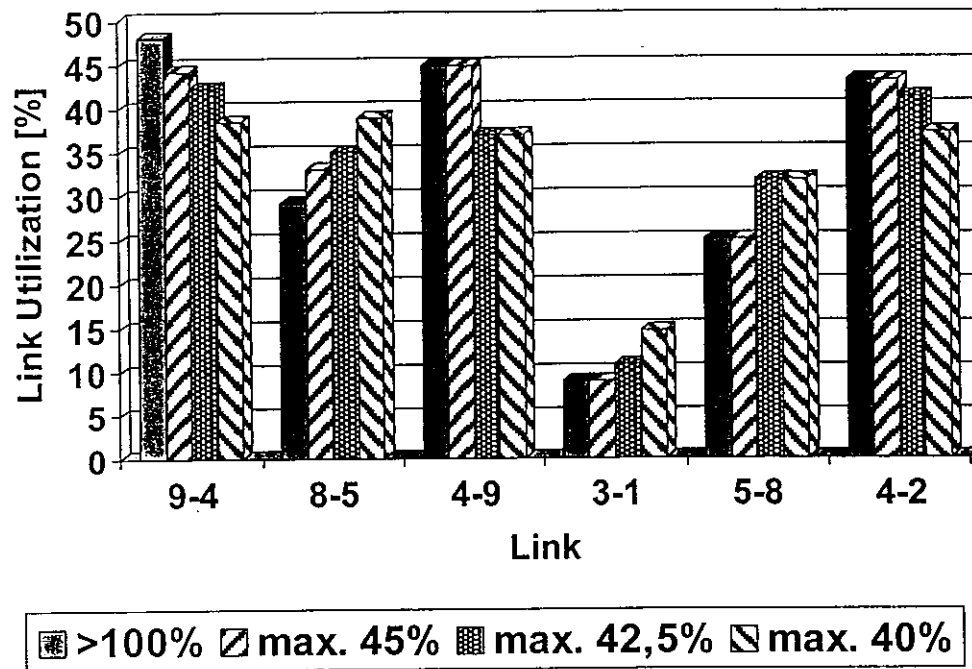


Figure 11: link utilization for selected data links of the 14 node network

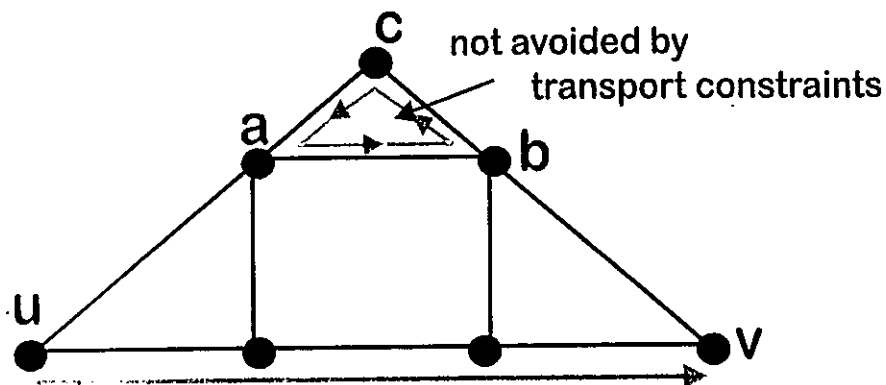


Figure 12: loops which are only avoided by the objective function and not by the transport constraints

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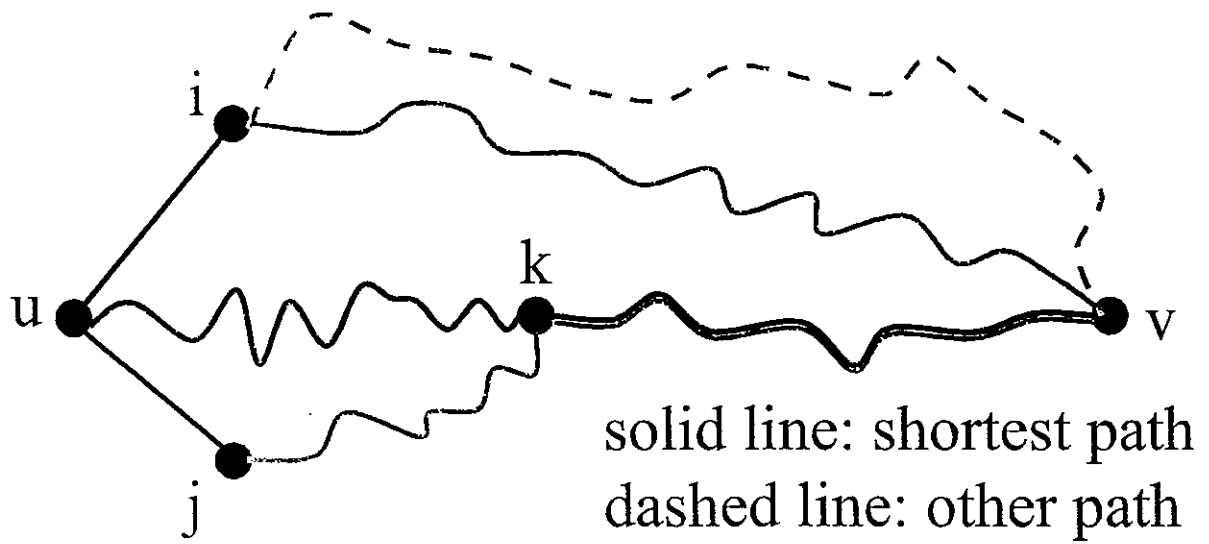


Figure 13: Example for link cost algorithm