Algorithmen zur Visualisierung von Graphen

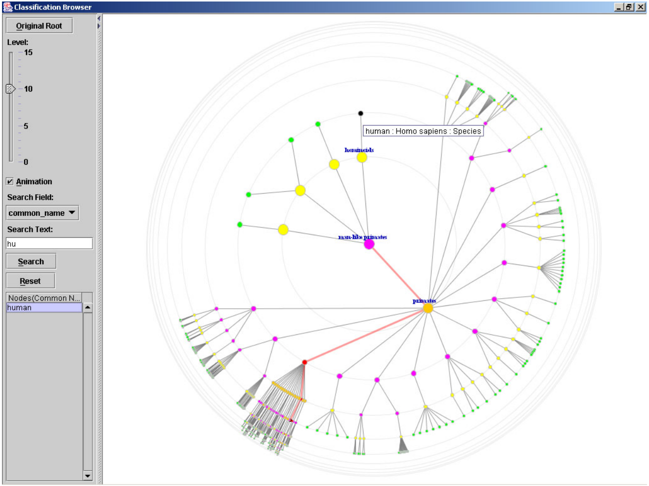
Teile & Herrsche-Algorithmen: Bäume und serienparallele Graphen

Vorlesung im Wintersemester 2010/2011

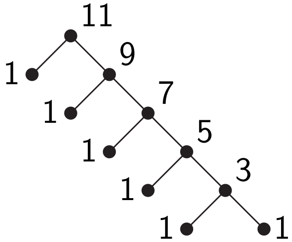
Robert Görke

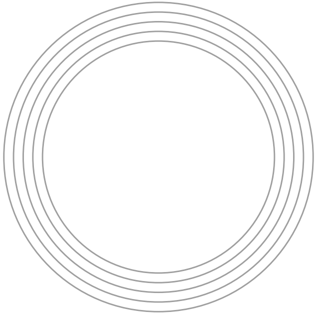
26.01.2011

Radiale Baumlayouts



Beispiel Radiallayout





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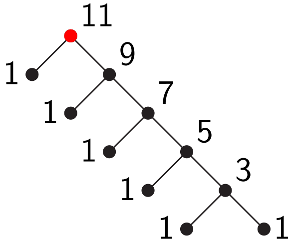

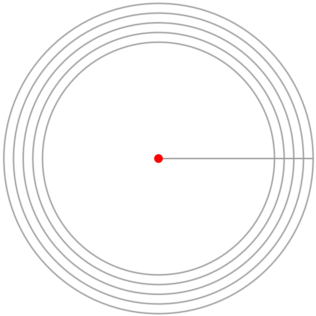

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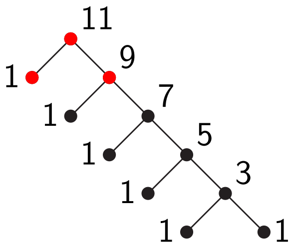

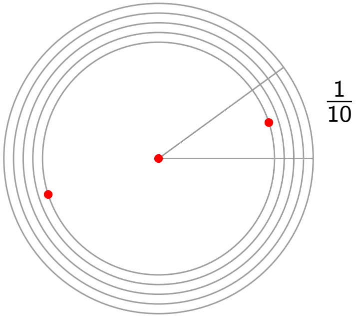

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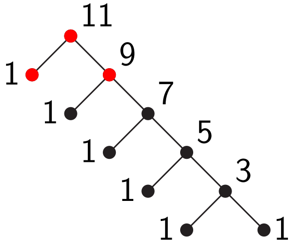

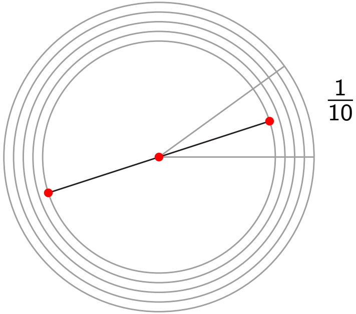

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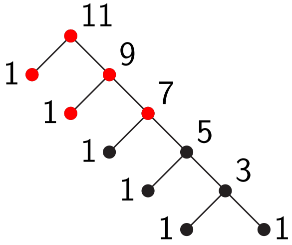

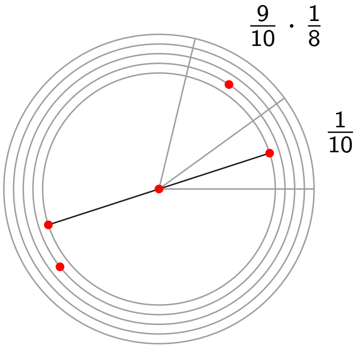

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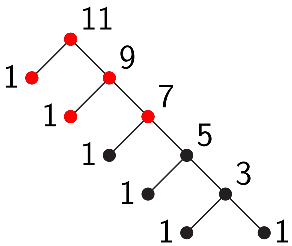

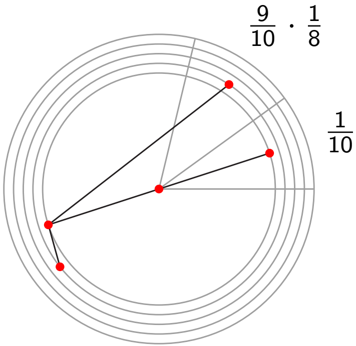

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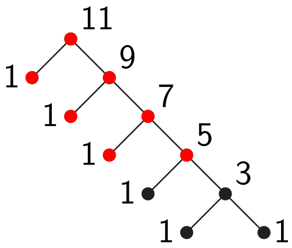

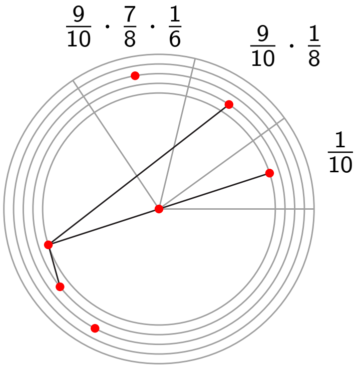

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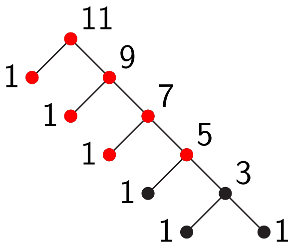
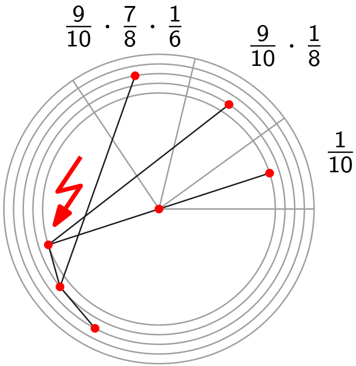
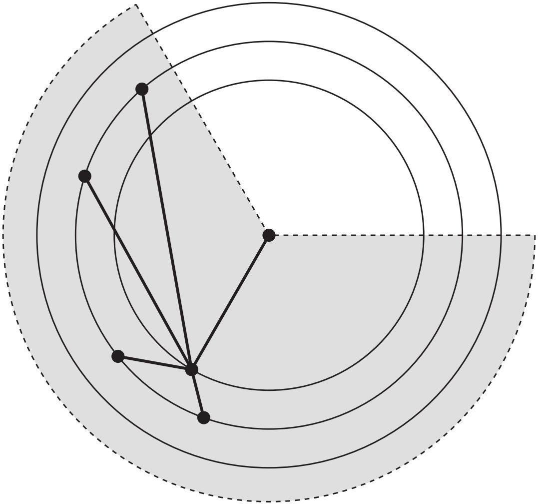




Verlassen des Kreisringsektors



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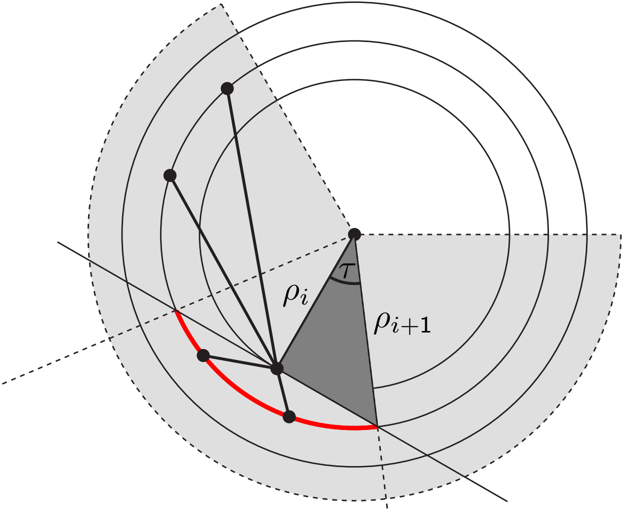

$$\cos\tau = \frac{\rho_i}{\rho_{i+1}}$$

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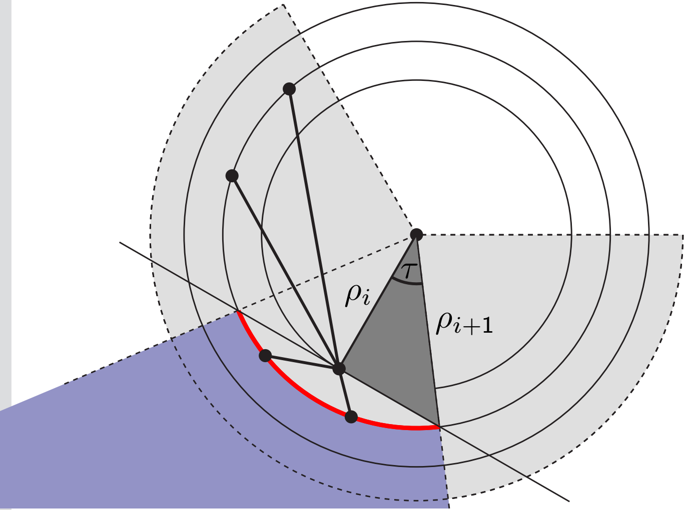
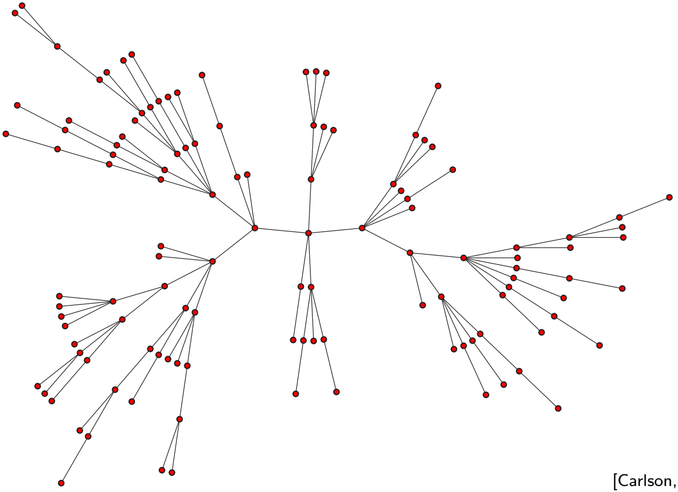


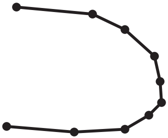
$$\cos\tau = \frac{\rho_i}{\rho_{i+1}}$$

Konvexe Baumlayouts mit optimalen Winkeln

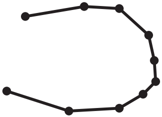


[Carlson, Eppstein '07]

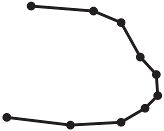
Definition: konvexer Bogen, konvexe Facette



konvexer Bogen:
Winkelintervall $\leq \pi$



kein konvexer Bogen:
Winkelintervall $> \pi$



kein konvexer Bogen:
Winkelfolge nicht monoton

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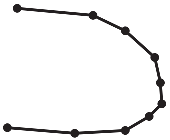

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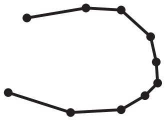

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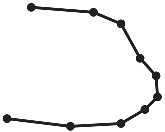

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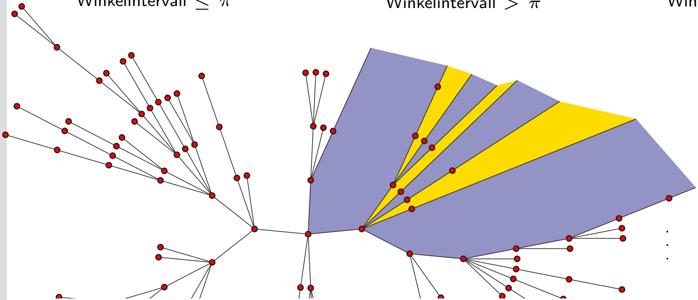
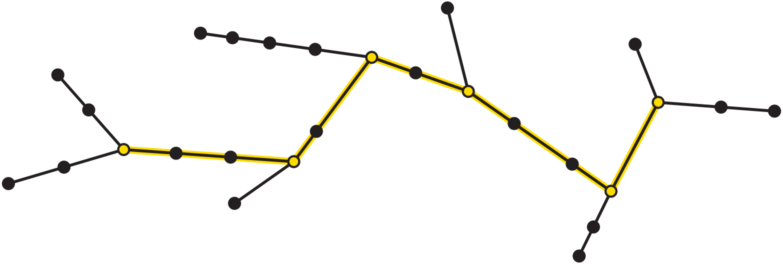


Definition: Ranke



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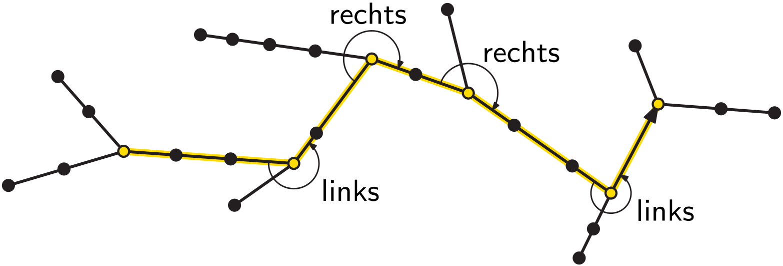

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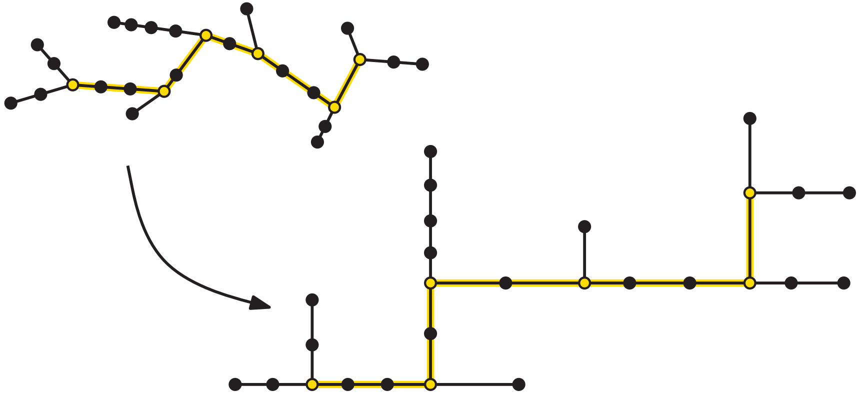
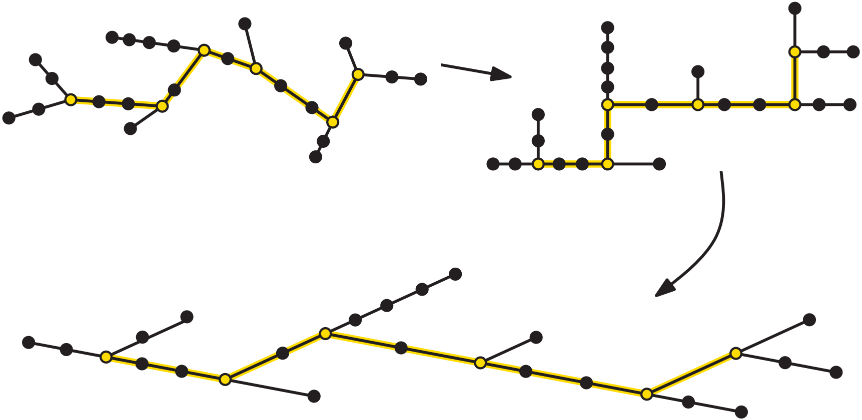
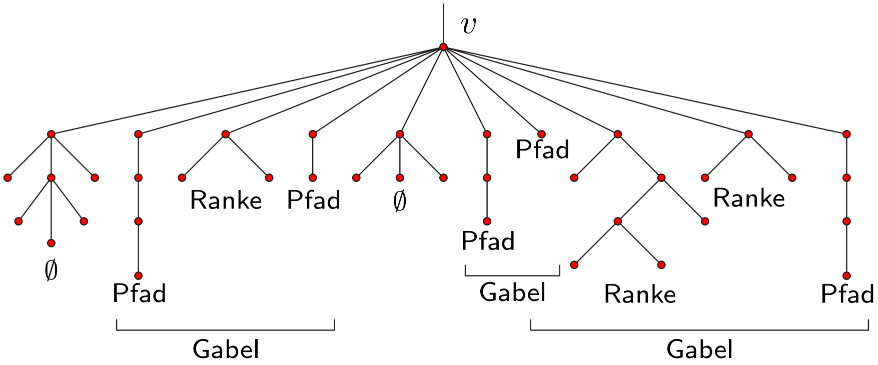


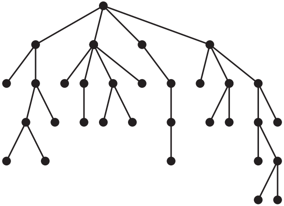
Definition: Ranke



Pfade, Ranken, Gabeln



Beispiel



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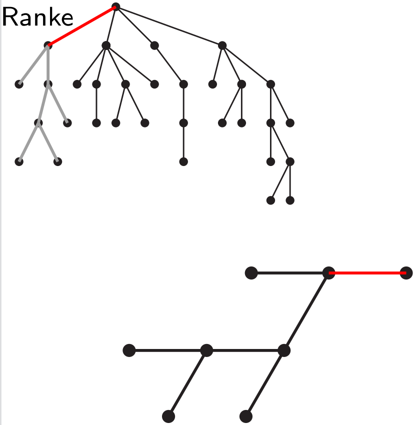

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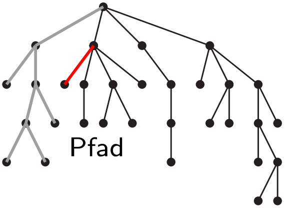

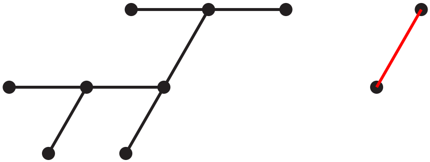

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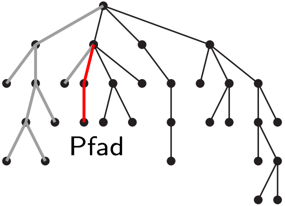

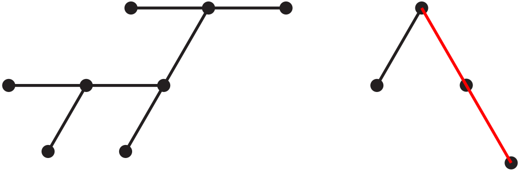

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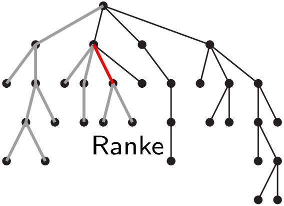

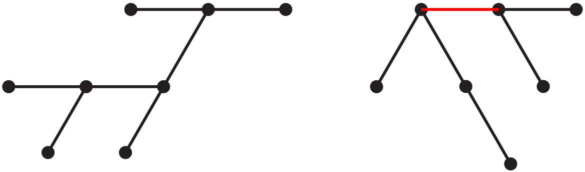

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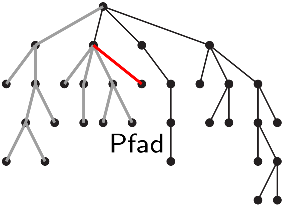

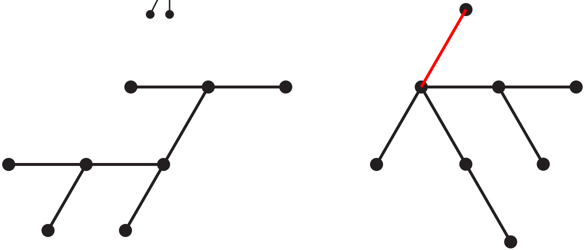

Beispiel

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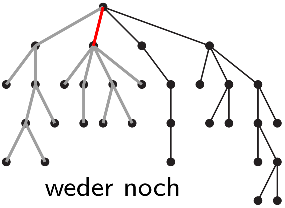

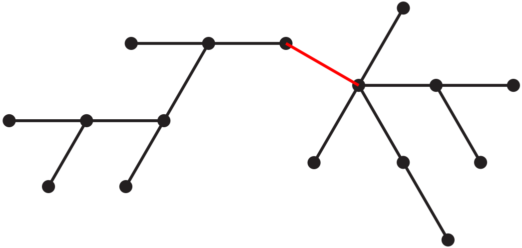

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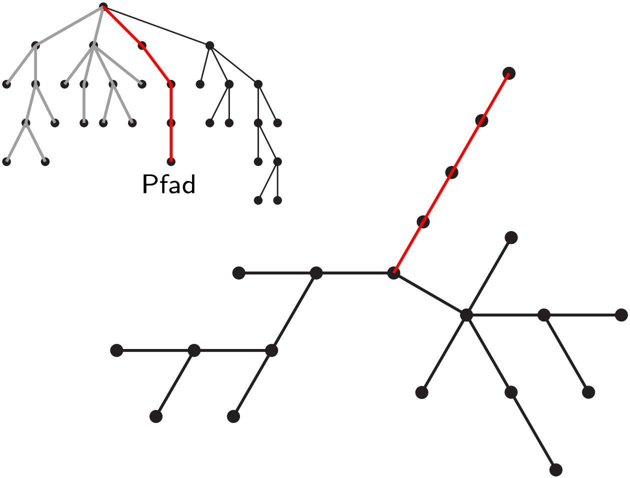

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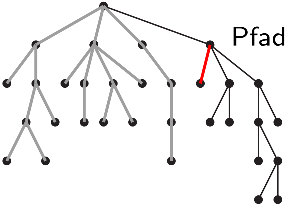

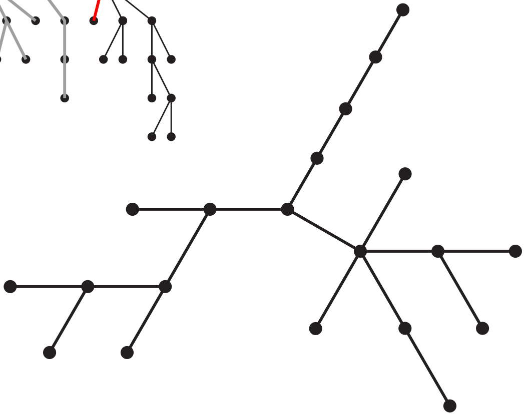

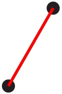

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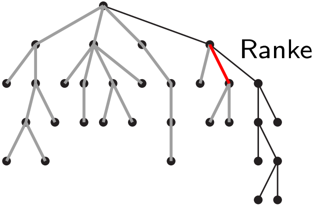

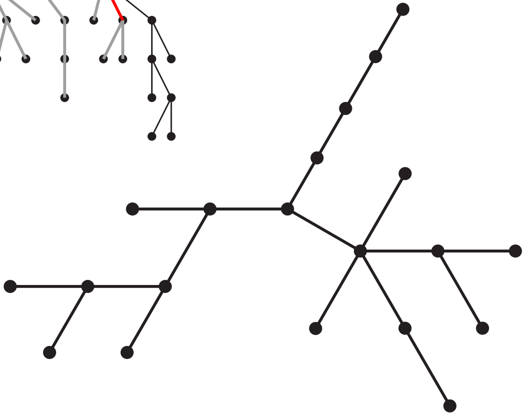

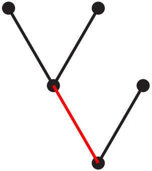

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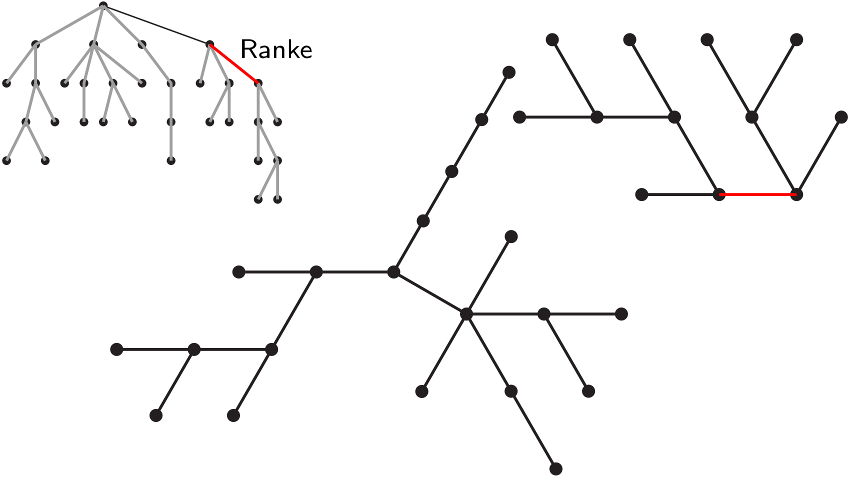

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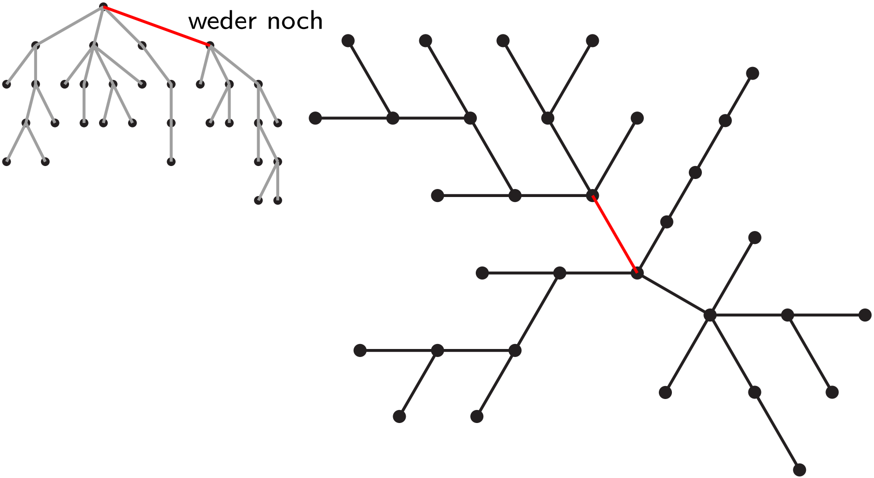
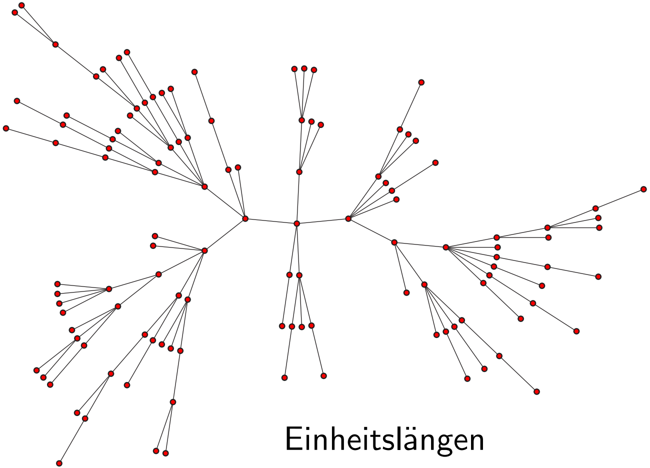
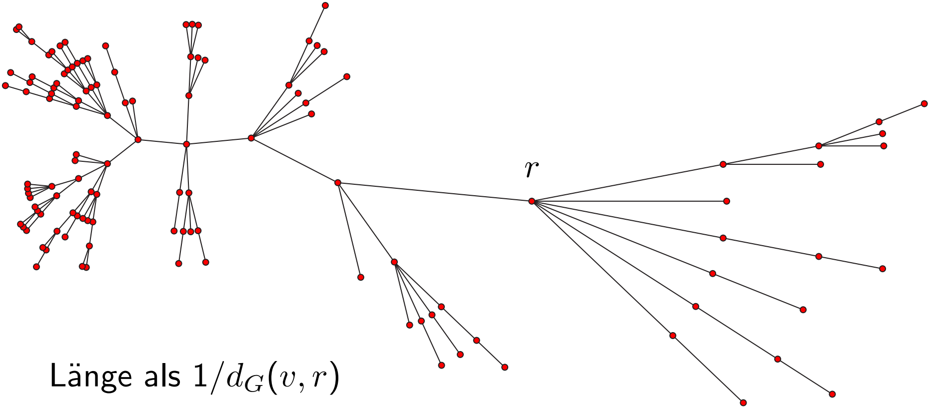


Längenzuweisungen



Einheitslängen

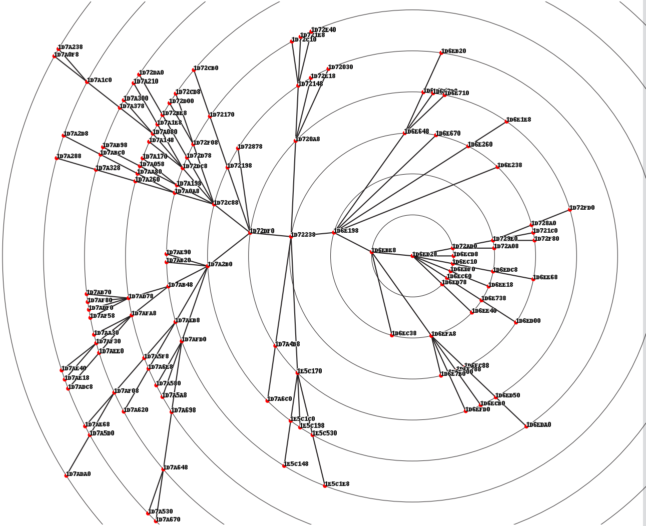
Längenzuweisungen



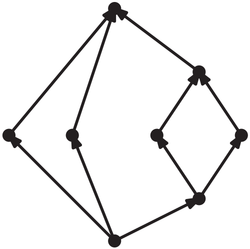
Länge als $1/d_G(v, r)$

Längenzuweisungen

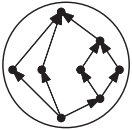
Radiallayout



Serienparallele Graphen



Serienparallele Graphen: Dekompositionsbaum



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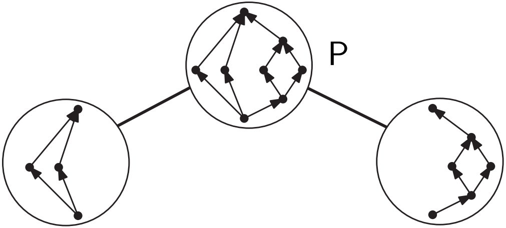

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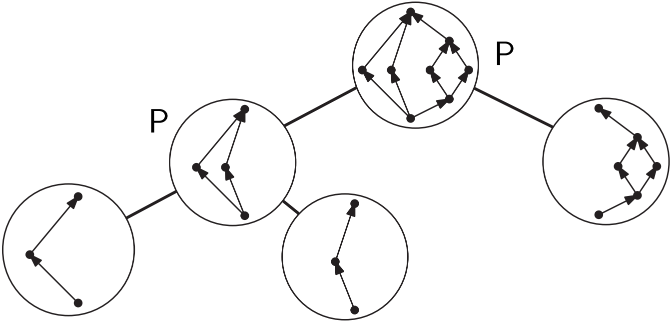

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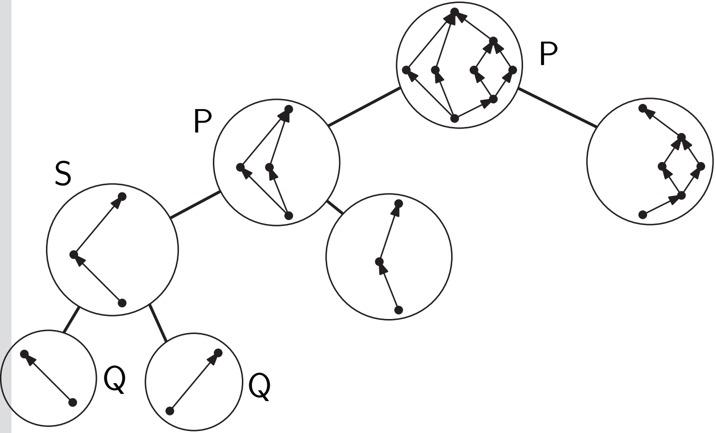

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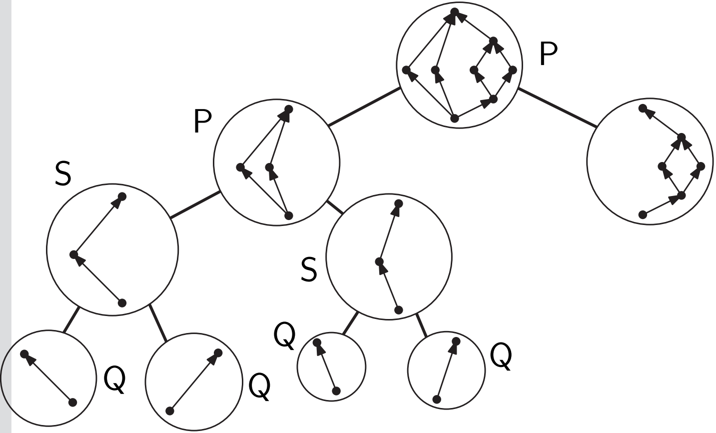

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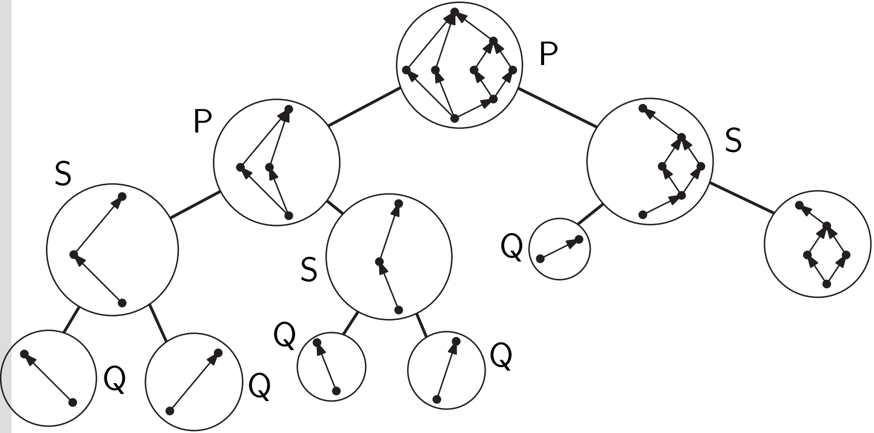

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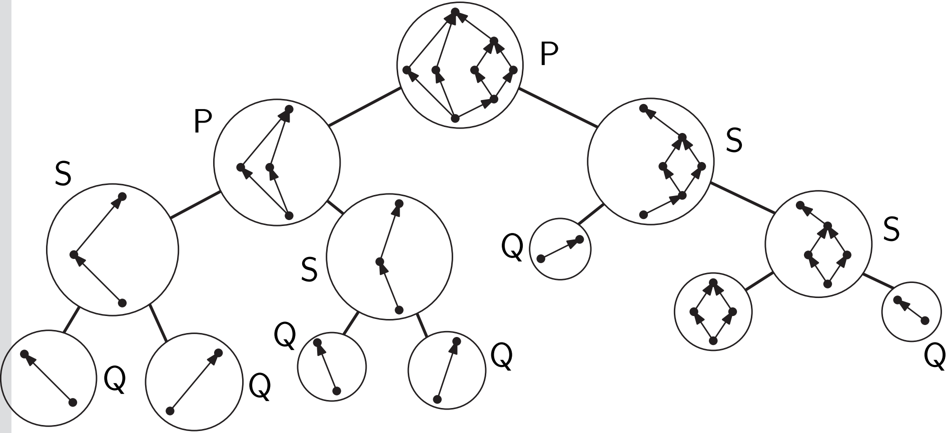

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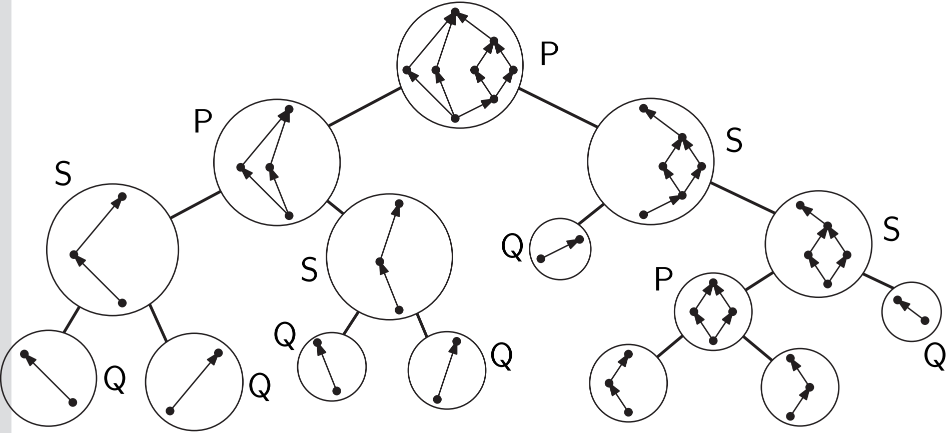

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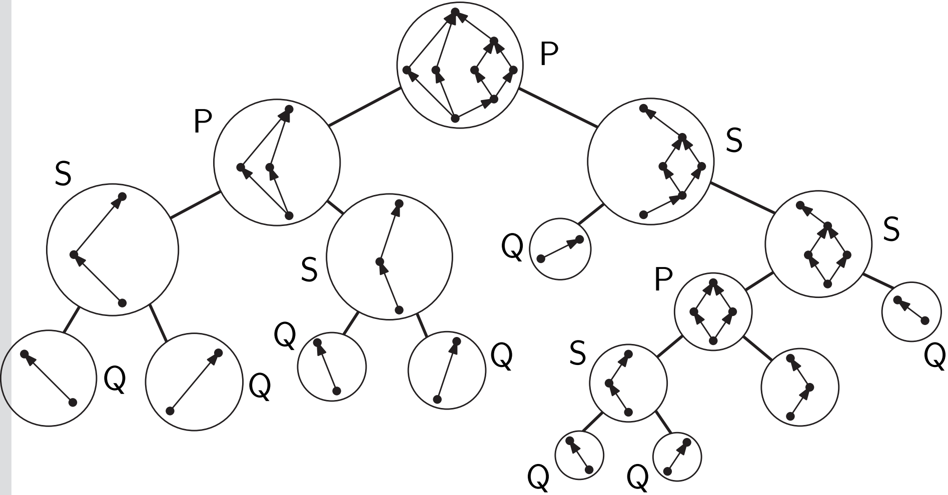

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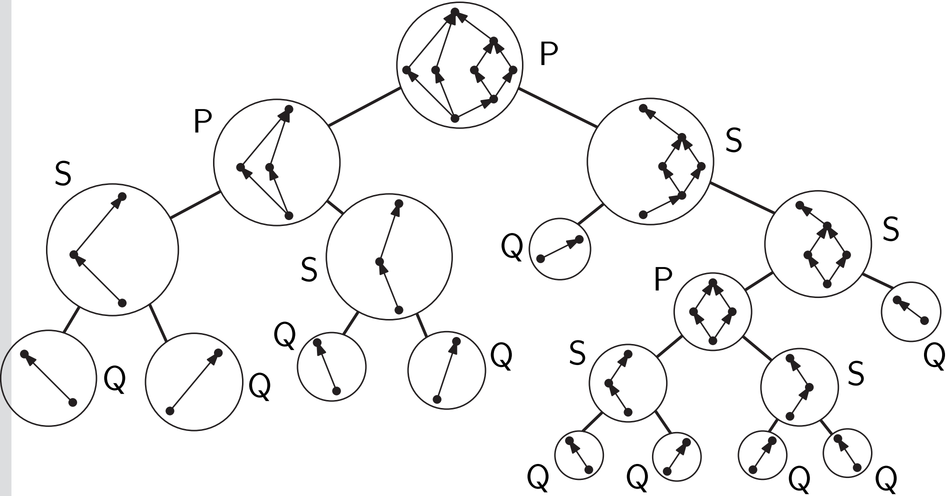

SP-Graphen in Anwendungen

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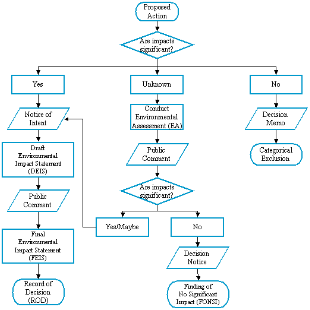
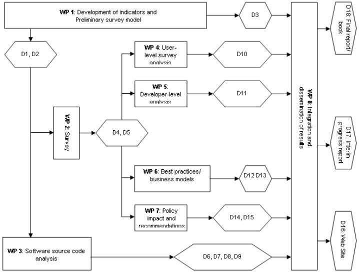


Ablaufdiagramme



PERT-Diagramme

(Program Evaluation and Review Technique)

Außerdem: Linearzeitalgorithmen für sonst NP-vollständige Probleme (z.B. Maximum Independent Set)

Untere Schranke für die Fläche

Karlsruher Institut für Technologie

Satz: (Bertolazzi et al. '94)

Es gibt eine Familie G_n von Graphen mit $2n$ Knoten, deren Zeichnung einen Platzbedarf von $\Omega(4^n)$ hat.

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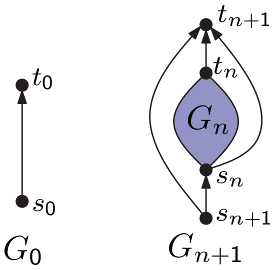

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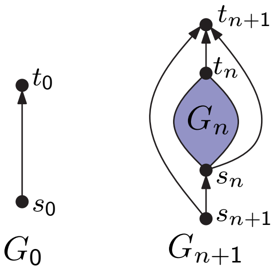

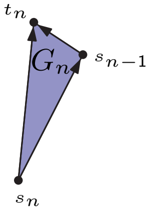

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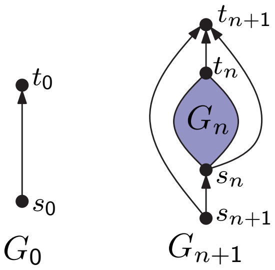

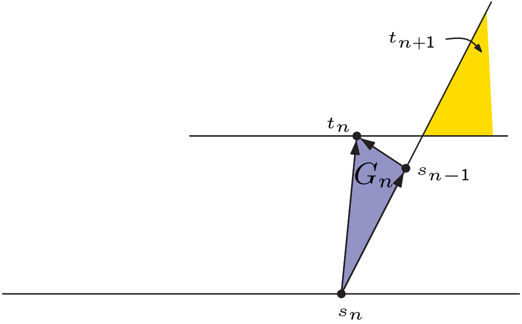

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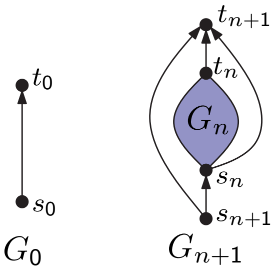

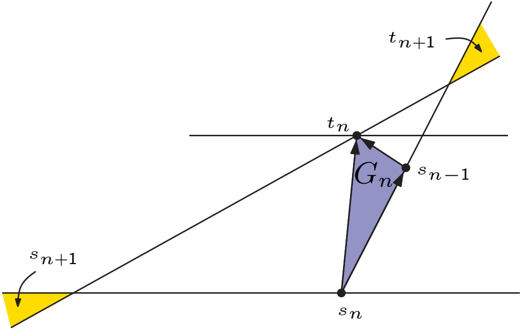

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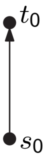
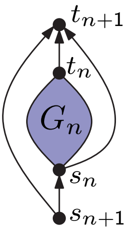
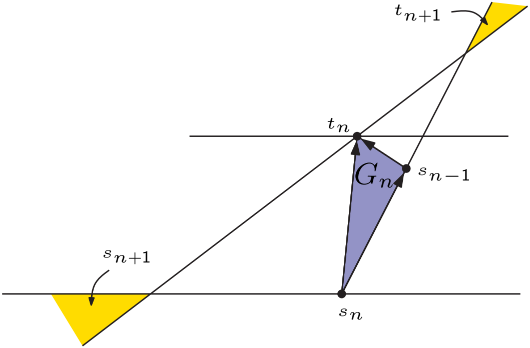


G_0



G_{n+1}



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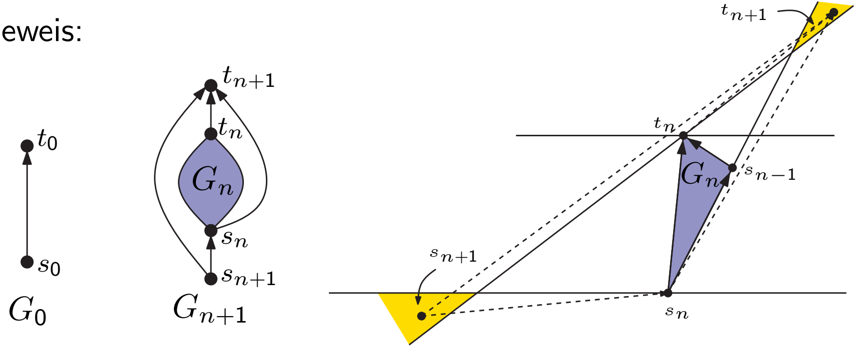

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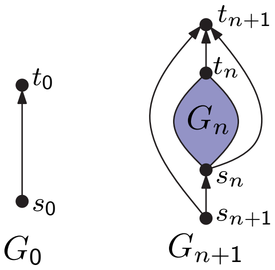

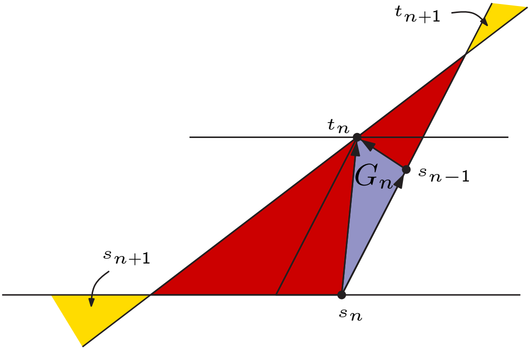

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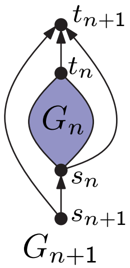

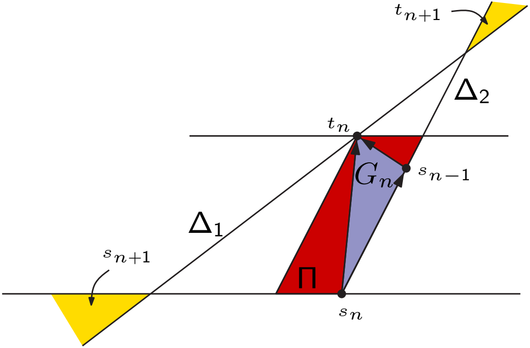

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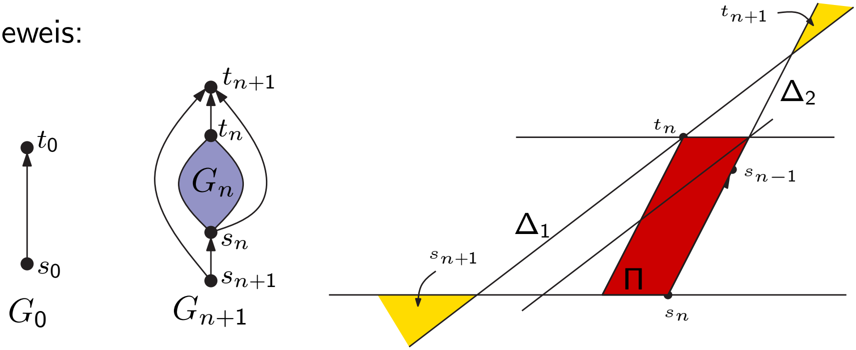

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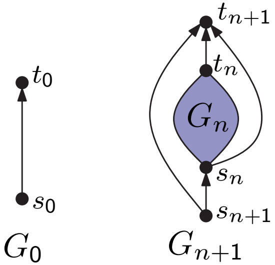

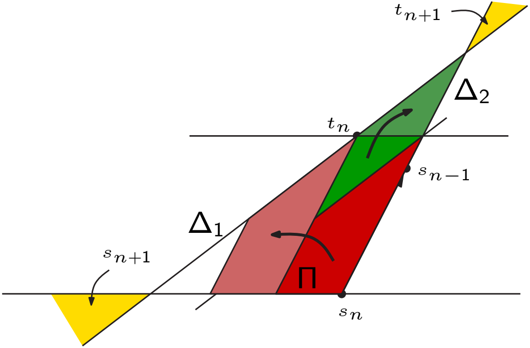

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