

Fig. 10. Generation ratios in different optimization alternatives

### H. Trading with energy

The non-physical trade on the power exchange looks for the optimal (cheapest) trading path (see fig. 11.). As constraint one must handle the inter-state bottle necks. [10]

- trade-flow modelling (not real power flow!)
- demand – offer balance
- price compensation mechanism
- market-coupling
- cross border capacity allocation
- individual transactions
- optimization for bottle neck flow – different interests of trader (cost minimization) and system operator (system stability)

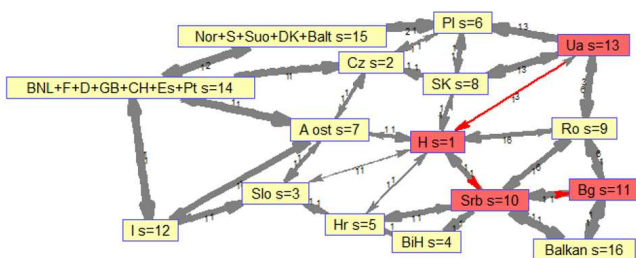


Fig. 11. Cheapest path

The main idea of the simulation is that we are looking for the optimal – that is the minimal price. All the countries are looking for the appropriate amount of energy at the cheapest price. In the first step we minimize the total market costs (the sum of all national energy costs) – Single Objective Optimization.

- Possible technique: Linear Programming

## 5. Conclusion

The world itself and the power systems are getting more complex. The efficient control requires metaheuristic approaches. Network analysis becomes on-line (like the fuzzy technique in the industry). The problem of the Multi Object Optimization has a human factor, somebody should decide what the real objective is. The optimal solutions can be calculated – but it is not at all easy to put them into action in reality.

## References

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