

Forest Stand and Enterprise Level

Links and Solutions with Full Enumeration and Linear Programming

Ruth Dirsch

Optimal stand treatment and optimal forest planning are usually treated as separate problems, though it might be favorable for a forest enterprise to treat stands different, if certain boundaries limit the freedom of action.

Common formulations for forest level planning like Knoke et al. (2005) optimise between the two alternatives thinning and clearcutting of stands. Furthermore restrictions concerning minimum annual earnings, maximum annual cut, minimum stock level amongst others are made to consider the requirements of the owner and forest legislation. In this study, based on data from the Ostalb region in southern Germany, it was possible to test these restrictions with a scale of different stand treatment alternatives. The eight different management alternatives reached from not thinning the stand over light thinning to heavy thinning until final harvest of the whole stand, being a selection from a full enumeration of treatment options over the 30 year planning horizon. In the model enterprise this additional choice of different treatment options, compared to a given harvest programme, led to minimally better results in the objective function values. Note that this was the case, when the best harvest policy on stand level was one of the eight choices. Purely stand level optimisation with full enumeration allowed an average of 15-25% additional objective function value compared to traditional thinning schemes. The actual gain of the proposed solution linking stand treatment options with enterprise based optimisation is not to be seen in the additional value of the objective function, but moreover in the better adaptation of the actual management carrying out heavier or lighter thinnings according to the restrictions imposed.

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*Unit for Economics and Forest Technology, Bavarian State Institute of Forestry
Institute of Forest Management, Technical University of Munich
Am Hochanger 11, 85354 Freising, Germany
ruth@dirsch.com*