A Combinatorial Optimization Model for Broadband Transmission Network Design Problem

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We address a new class of combinatorial optimization problems that arise in the design of broadband transmission network. With some assumptions reflecting real world applications, a comprehensive design model is maid to cover three types of decisions in one setting: locating hub facilities, placing conduits and installing cables therein. The model is formulated as a 0-1 linear programming problem embedding multicommodity network flow problem. Owing to the intrinsic difficulty of the problem, we focus on method for generating good lower bound and heuristic solution. Exploring the special structure of the the model, a dual based heuristic is developed for obtaining near optimal solutions. The performance of the proposed heuristic is well demonstrated by the extensive computational experiments to be vary satisfactory in quality of solution generated.