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指導教員 承認印	
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学位（博士）論文要旨

(Doctoral thesis abstract)

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主指導教員氏名 (Name of supervisor)	長坂 研 
論文題目 (Title)	Planning and Operation of Run-of-River Cascade Hydro Power Considering Extreme Conditions Run-of-River カスケード水力発電計画および過酷環境を考慮した運用
論文要旨 (2000 字程度) (Abstract (400 words)) ※欧文・和文どちらでもよい。但し、和文の場合は英訳を付すこと。 (in English or in Japanese) In this dissertation, some methods are presented for addressing the planning and operation of cascade hydro power considering extreme conditions of Nepal. So far, in Nepal Run-of-River cascade hydro power techniques are not applied to most of the rivers. There are a great needs for introducing the multiple cascade hydro power plants in the same river rather than a single dam. Applying the cascade hydro power systems, we can generate a massive amount of electricity. There are three main objectives of this study; first, design and analyze the planning and operation of the grid-connected existing and proposed cascade hydro power plants; for this reason, in this dissertation, after the existing hydro power plants, we consider a Run-of-River cascade hydro power plants in the downstream of the river to generate the hydroelectricity. This study focuses on clean energy sources, namely Run-of-River cascade hydroelectricity and presents an intelligent technique for the generation of hydro power. The proposed cascade hydro power plants are medium heads (Head < 50 m) with different installed capacities. Considering the installed capacity for Case 1 is 30 MW and for Case 2 is 40 MW. Based on the hydrology	

and geology point of view a medium head hydro power plants could consider in the mainstream of river after the existing hydro power plants. A Power Systems Computer Aided Design (PSCAD) simulator is used for design and analyze of the dynamic performance of existing and proposed cascade hydro power plants.

Second, the location of the proposed cascade hydro power plants and river flow characteristics of a different period of years are identified. The Run-of-River flow prediction model is designed in a Radial Basis Function Network (RBFN) network. Moreover, in this study, short-term river flow characteristics are predicted to identify the hydroelectric potential in extreme conditions.

Finally, the Economic Load Dispatch (ELD) and Optimal Power Flow (OPF) for the existing and proposed hydro power plants are identified and analyzed. In this study, two different cases considering maximum and minimum electricity generation periods for design and operation of large-scale grid-connected power systems. These large-scale power systems are designed in Power World simulator environment. The designed proposed model balances the system load and significantly reduce the import power from neighboring country India. The obtained simulation results show that the proposed system is more reliable and secure. The surplus power management system also considered in the proposed model. Based on the finding results, we believe that this study will be useful for real-time power scheduling solution.

(英訳) ※和文要旨の場合 (400 words)