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Dynamics of a solar-powered fractional horse power motor

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Abstract:
A photovoltaic (PV) power system provides an effective method of power generation, this is particularly relevant to developing countries, where the demographics show that the majority of the population are settled in remote and isolated settlements. The problem with these settlements is that they generally have no access to the electric grid and often lack basic infrastructure. Technological developments such as the photo-voltaic power system has brought a lot of relief which helps to alleviate the energy problems experienced by the developing communities, as these systems are easy to install, low maintenance, modular and cost effective with regards to energy generation. This paper provides the analysis of the steady-state performance and dynamics of the photovoltaic fuel generator (PVFC) for localized load management in standalone systems. The results obtained for the dynamic and steady state characteristics are presented and discussed. Photovoltaic systems have been employed in driving different types of load, such as direct current motors; therefore understanding the system operation and matching of the system components for a particular PV system and load type are important factors in system design.

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I. Introduction

Electric power is needed for domestic and commercial loads both in rural and semi urban areas. The population continues to experience growth but there hasn't been any expansion of the present capacity in most sub-urban areas. However, distributed generation (DG) is one of the new technologies needed to bridge the gap between population growth and the provision of efficient, quality and cheap energy. PV systems are examples of DG. The PV system is an uncontrolled power source whose behaviour is somewhat different from conventional power supplies. In the conventional power supply, the system designer makes the best adaptation of the electrical motor to a mechanical load. This is possible since the power supply is from an infinite bus. PV systems have to be designed economically and its operation has to be tailored such that it is very close to the maximum output of the solar generator.

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1. R.W. Maltin, "Design optimization and performance characteristics of a photovoltaic micro-irrigation system for use in developing countries", MIT Lincoln Lab., COO/4094-33, 1979.
[Google Scholar](#)

2. Y.R. Hsiao and B.A. Blevins, "Direct coupling of photovoltaic power source to water pumping system", Solar Energy, Vol. 32, pp. 489-498, 1984.
[CrossRef](#) [Google Scholar](#)

- ☐ 3. W.Z. Fam and M. K. Balachander, "Dynamic performance of a DC shunt motor connected to a photovoltaic array", IEEE Transactions on Energy Conversion, Vol. 3, No. 3, September 1988, pp. 613-617.
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4. J. Appelbaum and J. Bany, "Performance analysis of dc motor photovoltaic converter system - I", Solar Energy, Vol. 22, pp. 439-445, 1979.
[CrossRef](#) [Google Scholar](#)

5. A. Brauntein and A. Kornfeld, "Analysis of solar powered electric water pumps", Solar Energy, Vol. 27, 1981, pp. 235-240.
[CrossRef](#) [Google Scholar](#)

6. J.A Roger, "Theory of the direct coupling between dc motors and Photovoltaic solar arrays", Solar Energy, VOL. 23, 1979, pp. 193-198.
[CrossRef](#) [Google Scholar](#)

7. I. E Davidson, "Performance Analysis of a Solar-Powered Fractional Horsepower Universal Motor". In Proceedings of the 7 IEEE Region 8 (Africon) Conference, Gaborone, Botswana, September 15-17, 2004, pp 1179-1184.
Google Scholar 

8. Florida Solar Energy Centre- a Research Institute of the University of Florida. Available: <http://www.fsec.ucf.edu/pvt/education/inspgcps/handbook.pdf>

9. United States Department of Energy. Available at: <http://www.eere.energy.gov/solar/photovoltaics.html>

10. A.D. Sanca, P. Sorensen, L.H. Hansen and H. Binder, "Models for a standalone System", Riso National Laboratory, Roskilde, December 2000
Google Scholar 

11. A. Luque and S. Hegedus, "Handbook of Photovoltaic Science and Engineering", John Wiley & Sons, 2002 pp 92-93.
Google Scholar 

12. S. Rauschenbach, "Solar Cell Array Design Handbook", Van Nostrand Reinhold Company, 1980. pp 55-59.
CrossRef  Google Scholar 

13. Shell Solar Product Information Sheet, Shell Sm110-24 Photovoltaic Solar Module. Available at: http://www.solarexpert.com/Shell/ShellSM110-24P_US.pdf.
Google Scholar 

14. A. Hoque, "A Methodology for Analyzing Electrical Energy Options for Isolated Areas", Ph.D. Thesis, (Chapter 6 & 7), Dept. EEE, BUET, Dhaka, Bangladesh, 1990.
Google Scholar 

15. A. Hoque and K. A. Wahid, "New Mathematical model of a Photovoltaic Generator", Journal of Electrical Engineering, The Institute of Engineers, Bangladesh, Vol. EE 28, No. 1, June 2000.
Google Scholar 

- ☐ 16. M.M. Bello and I. E. Davidson, "Spatial Modeling and Dynamics of a PV Fuel Cell Generator for Renewable Energy Application". In Proceedings of the Inaugural IEEE-PES Conference in Africa, Durban, South Africa, July 11-15, 2005, pp 125-131.
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