بيانــات البحــث رقم (8) المقــدم للترقيــة

رقم البحث في القائمة المعتمدة	**8**			
عنوان البحث باللغة العربية	النموذج المتزامن والطريقة التسلسلية للوصول للحل الأمثل لمشكلة جدولة المحطات الكهرومائية لتخزين وتوليد الكهرباء بالضخ مع الأخذ في الاعتبار الأعطال العشوائية للمضخات			
عنوان البحث باللغة الانجليزية	**Simultaneous and sequential stochastic optimization approaches for pumped storage plant scheduling with random breakdowns**			
أسماء المؤلفين المشاركين بالترتيب	1- **Zakaria Yahia**	Fayoum University (corresponding author)		
	2- Anup Pradhan	University of Johannesburg		
اسم المجلة + رقم المجلد والعدد + ISSN	**ISSN: 0360-5442**	**Energy**		
		Volume	**204**	**Issue** **-**
تصنيف المجلة	**CiteScore**	**Scopus**	**IF**	**Web of science**
	9.9	**Q1**	**6.082**	**Q1**
تاريخ النشر	**May 2020**			
هل البحث مشتق من رسالة علمية؟	البحث غير مشتق من رسالة علمية			

ملخص البحث باللغة الإنجليزية:

This paper addresses a pumped-storage stations scheduling problem. The study contribution is threefold. First, a new service-related multi-objective function is proposed. The model aims to minimize the supply-demand disparity function and the pump maintenance cost in terms of the number of pump switches. Second, the proposed mathematical formulation considers individual units scheduling and random breakdowns. Furthermore, this work considers the electricity demand uncertainty in hourly and daily basis. Third, a new sequential two-stage formulation is proposed. The Sample Average Approximation method is applied to handle the grid demand uncertainty, stochastic failures and unplanned maintenance of pumping units. Goal programming is applied at the second-stage to handle the conflicting objective functions and avoid the model infeasibility. A case study data based on the Ingula pumped-storage station in South Africa is used to test the performance of the proposed approach. A comparison between the two-stage sequential approach and a simultaneous approach showed the superior performance of the two-stage sequential approach in terms of modelling complexity and computational time. Furthermore, experimental analysis showed that involving more pumping/generating units could improve the service level by reducing Disparity Index. Moreover, the two-stage sequential approach showed a superior performance even for the larger size instances.