

Accepted Manuscript

Over relaxed hybrid proximal extragradient algorithm and its application to several operator splitting methods

Li Shen

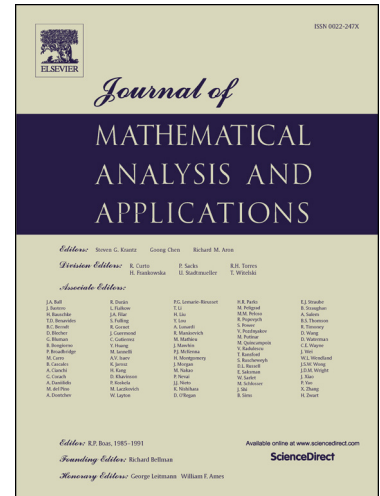
PII: S0022-247X(16)30701-6
DOI: <http://dx.doi.org/10.1016/j.jmaa.2016.11.018>
Reference: YJMAA 20871

To appear in: *Journal of Mathematical Analysis and Applications*

Received date: 15 March 2016

Please cite this article in press as: L. Shen, Over relaxed hybrid proximal extragradient algorithm and its application to several operator splitting methods, *J. Math. Anal. Appl.* (2017), <http://dx.doi.org/10.1016/j.jmaa.2016.11.018>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



1 Over relaxed Hybrid Proximal Extragradient Algorithm
2 and Its Application to Several Operator Splitting Methods

3 Li Shen*

4 Revised: September 22, 2016

5 **Abstract**

6 In this paper we propose a new over-relaxed variant of the hybrid proximal ex-
7 tragradients (HPE) algorithm, for the monotone inclusion problem, which uses a
8 projection-free extragradient step with explicit over relaxed stepsize. Its global con-
9 vergence as well as ergodic and nonergodic complexity rates are established. More-
10 over, local linear convergence rates are derived under some mild regularity condition.
11 One benefit of the new over relaxed variant of the HPE is that it covers a large
12 class of popular operator splitting methods and their over relaxed versions, thus
13 providing a comprehensive insight on these operators splitting methods. In particu-
14 lar, forward Douglas Rachford splitting method, forward Spingarn's Partial Inverse
15 method, forward Spingarn's partial inverse forward method and Davis-Yin's three
16 operator splitting method are all included as special cases of the over relaxed HPE al-
17 gorithm. Another benefit is that the interval of stepsize relaxation is easily estimated
18 for these operator splitting methods under the presented framework. Additionally,
19 the over relaxed Korpelevich's method and over relaxed forward-backward-forward
20 method are formulated directly with convergence guarantee based on the proposed
21 framework. The third benefit is that the local linear convergence for a large class
22 of operator splitting methods are established effortlessly under metric subregularity
23 condition. Moreover, this linear convergence condition is shown weaker than some
24 existing ones that almost all require the strong monotonicity of the composite op-
25 erators.
26

27 **Keywords:** over relaxed HPE, complexity rate, linear convergence, metric subreg-
28 ular, operator splitting methods

29 **AMS subject classification(2010):** 47H04, 47H05, 90C25
30

*School of Mathematics, South China University of Technology, Guangzhou, 510641, China
(shen.li@mail.scut.edu.cn).

Download English Version:

<https://daneshyari.com/en/article/5775258>

Download Persian Version:

<https://daneshyari.com/article/5775258>

[Daneshyari.com](https://daneshyari.com)