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Some Remarks on Contraction Mappings in Rectangular b-metric Spaces

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ABSTRACT: In this paper, we give a short proof for Reich contraction in rectangular b-metric spaces and almost rectangular b-metric spaces with increased range of the Lipschtzian constants and illustrate this with a suitable example. Our results generalize, improve and complement several ones in the existing literature.

Key Words: Fixed points, b-metric space, Rectangular metric space, Rectangular b-metric space.

Contents

1. Introduction and Preliminaries

In the paper [5] George *et al.* introduced the concept of rectangular b-metric space, (see also [3,4,9]) which is not necessarily Hausdoff and which generalizes the concept of metric space, rectangular metric space and b-metric space (some results in b-metric spaces can be seen in [1,2]). Later many fixed point results were proved in a rectangular b-metric space (see [3,4,9]).

Definition 1.1. *[5] Let X be a nonempty set and the mapping $d : X \times X \to [0, \infty)$ satisfies:*
(RbM1) $d(x, y) = 0$ if and only if $x = y$;
(RbM2) $d(x, y) = d(y, x)$ for all $x, y \in X$;
(RbM3) there exists a real number $s \geq 1$ such that $d(x, y) \leq s[d(x, u) + d(u, v) + d(v, y)]$ for all $x, y \in X$ and all distinct points $u, v \in X\backslash\{x, y\}$.
Then d is called a rectangular b-metric on X and (X, d) is called a rectangular b-metric space (in short RbMS) with coefficient s.

Definition 1.2. *[5] Let (X, d) be a rectangular b-metric space, $\{x_n\}$ be a sequence in X and $x \in X$. Then*
(a) The sequence $\{x_n\}$ is said to be convergent in (X, d) and converges to x, if for every $\varepsilon > 0$ there exists $n_0 \in \mathbb{N}$ such that $d(x_n, x) < \varepsilon$ for all $n > n_0$ and this fact is represented by $\lim\limits_{n\to\infty} x_n = x$ or $x_n \to x$ as $n \to \infty$.

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(b) The sequence $\{x_n\}$ is said to be Cauchy sequence in (X, d) if for every $\varepsilon > 0$ there exists $n_0 \in \mathbb{N}$ such that $d(x_n, x_{n+p}) < \varepsilon$ for all $n > n_0, p > 0$.
(c) (X, d) is said to be a complete rectangular b-metric space if every Cauchy sequence in X converges to some $x \in X$.

The main result in the paper [5] is the following theorem (analogue of Banach contraction principle in rectangular b-metric space).

Theorem 1.3. *Let (X, d) be a complete rectangular b-metric space with coefficient $s > 1$ and $T : X \to X$ be a mapping satisfying:*

$$d(Tx, Ty) \leq \lambda d(x, y) \tag{1.1}$$

for all $x, y \in X$, where $\lambda \in [0, \frac{1}{s}]$. Then T has a unique fixed point.

George *et al.* (Open problems on page 1012 in [5]) raised the following problems.

Problem 1. *(Open Question 1) In Theorem 1.3, can we extent the range of λ to the case $\frac{1}{s} < \lambda < 1$?*

Problem 2. *(Open Question 2) Prove analogue of Chatterjee contraction, Reich contraction, Ciric contraction and Hardy-Rogers contraction in RbMS.*

In [7], the author has given a positive answer to the Open Question 1 of [5]. The purpose of this paper is to obtain analogue of Reich's contraction principle (see [8]) in RbMS and thus give a partial solution to the Open Question 2 of [5]. We have also obtained an analogue of Reich's contraction principle and Banach contraction principle in an almost rectangular b-metric space, which is possibly a more generalised version of rectangular b-metric space. Our results improve the results of [4], [5] and [7] in the sense that the range of Lipschitzian constants used have been significantly increased in our results and also we have proved the results in a more generalised concept of almost rectangular b-metric space..

2. Main Result

The following theorem is the analogue of Reich's contraction principle in rectangular b-metric space.

Theorem 2.1. *Let (X, d) be a complete rectangular b-metric space with coefficient $s > 1$ and $T : X \to X$ be a mapping satisfying:*

$$d(Tx, Ty) \leq \alpha d(x, y) + \beta d(x, Tx) + \gamma d(y, Ty) \tag{2.1}$$

for all $x, y \in X$, where α, β, γ are nonnegative constants with $\alpha + \beta + \gamma < 1$ and $\min\{\beta, \gamma\} < \frac{1}{s}$. Then T has a unique fixed point x^* and $\lim_{n\to\infty} T^n x = x^*$, for all $x \in X$.

Proof: Let $x_0 \in X$ be arbitrary. Define the sequence $\{x_n\}$ by $x_{n+1} = Tx_n$ for all $n \geq 0$. From condition (2.1) we have that

$$d(x_{n+1}, x_n) \leq \alpha d(x_n, x_{n-1}) + \beta d(x_n, x_{n+1}) + \gamma d(x_{n-1}, x_n).$$

Therefore,

$$d(x_{n+1}, x_n) \leq \frac{\alpha+\gamma}{1-\beta} d(x_n, x_{n-1}). \tag{2.2}$$

Put $\lambda = \frac{\alpha+\gamma}{1-\beta}$. We have that $\lambda \in [0,1)$. It follows from (2.2) that

$$d(x_{n+1}, x_n) \leq \lambda^n d(x_1, x_0) \text{ for all } n \geq 1. \tag{2.3}$$

If $x_n = x_{n+1}$ then x_n is fixed point of T. So, suppose that $x_n \neq x_{n+1}$ for all $n \geq 0$. Then $x_n \neq x_{n+k}$ for $n \geq 0, k \geq 1$. Namely, if $x_n = x_{n+k}$ for some $n \geq 0$ and $k \geq 1$ we have that $x_{n+1} = x_{n+k+1}$. Then (2.2) implies

$$d(x_{n+1}, x_n) = d(x_{n+k+1}, x_{n+k}) \leq \lambda^k d(x_{n+1}, x_n) < d(x_{n+1}, x_n),$$

a contradiction.

From conditions (2.1) and (2.3) we obtain

$$\begin{aligned} d(x_m, x_n) &\leq \alpha d(x_{m-1}, x_{n-1}) + \beta d(x_{m-1}, x_m) + \gamma d(x_{n-1}, x_n) \\ &\leq \alpha d(x_{m-1}, x_{n-1}) + \beta\lambda^{m-1} d(x_0, x_1) + \gamma\lambda^{n-1} d(x_0, x_1) \\ &= \alpha d(x_{m-1}, x_{n-1}) + (\beta\lambda^{m-1} + \gamma\lambda^{n-1}) d(x_0, x_1) \end{aligned}$$

From this, we have

$$d(x_m, x_n) \leq k d(x_{m-1}, x_{n-1}) + (k^m + k^n) d(x_0, x_1), \tag{2.4}$$

where, $k = \max\{\alpha, \beta, \gamma, \lambda\}$. From (2.4) we further obtain

$$d(x_m, x_n) \leq k^r d(x_{m-r}, x_{n-r}) + r(k^m + k^n) d(x_0, x_1), \tag{2.5}$$

for all $r \in \{1, \ldots, \min\{m, n\}\}$.

Since $\lim\limits_{n\to\infty} k^n = 0$, there exists a natural number n_0 such that

$$0 < k^{n_0} \cdot s < 1. \tag{2.6}$$

So, from (2.5) we obtain the following inequalities

$$d(x_m, x_{m+n_0}) \leq k^m d(x_0, x_{n_0}) + m(k^m + k^{m+n_0}) d(x_0, x_1), \tag{2.7}$$

$$d(x_{n+n_0}, x_n) \leq k^n d(x_{n_0}, x_0) + n(k^{n+n_0} + k^n) d(x_0, x_1), \tag{2.8}$$

$$d(x_{m+n_0}, x_{n+n_0}) \leq k^{n_0} d(x_m, x_n) + n_0(k^{m+n_0} + k^{n+n_0}) d(x_0, x_1). \tag{2.9}$$

Since (X, d) is rectangular b-metric space, from condition (RbM3) we have

$$d(x_m, x_n) \leq s[d(x_m, x_{m+n_0}) + d(x_{m+n_0}, x_{n+n_0}) + d(x_{n+n_0}, x_n)]. \tag{2.10}$$

From (2.10), together with (2.6), (2.7), (2.8) and (2.9) we obtain

$$\begin{aligned} d(x_m, x_n) &\leq s\frac{(k^m + k^n) d(x_0, x_{n_0})}{1 - k^{n_0} s} \\ &+ s\frac{[k^m(m + (m+n_0)k^{n_0}) + k^n(n + (n+n_0)k^{n_0})] d(x_0, x_1)}{1 - k^{n_0} s}. \end{aligned}$$

Since $\lim_{n\to\infty} k^n = 0$ and $\lim_{n\to\infty} nk^n = 0$, we have that $\{x_n\}$ is a Cauchy sequence in (X, d). By completeness of (X, d) there exists $x^* \in X$ such that

$$\lim_{n\to\infty} x_n = x^*. \tag{2.11}$$

Now we obtain that x^* is the unique fixed point of T. Namely, there exists $k \in \mathbb{N}$ such that for all $n > k$ we have

$$\begin{aligned} d(x^*, Tx^*) &\le s[d(x^*, x_n) + d(x_n, x_{n+1}) + d(x_{n+1}, Tx^*)] \\ &= s[d(x^*, x_n) + d(x_n, x_{n+1}) + d(Tx_n, Tx^*)] \\ &\le s[d(x^*, x_n) + d(x_n, x_{n+1}) + \alpha d(x_n, x^*) \\ &+ \beta d(x_n, x_{n+1}) + \gamma d(x^*, Tx^*)]. \end{aligned}$$

and

$$\begin{aligned} d(Tx^*, x^*) &\le s[d(Tx^*, x_{n+1}) + d(x_{n+1}, x_n) + d(x_n, x^*)] \\ &= s[d(Tx^*, Tx_n) + d(x_{n+1}, x_n) + d(x_n, x^*)] \\ &\le s[\alpha d(x^*, x_n) + \beta d(x^*, Tx^*) + \gamma d(x_n, x_{n+1}) \\ &+ d(x_{n+1}, x_n) + d(x_n, x^*)]. \end{aligned}$$

Since $\lim\limits_{n\to\infty} d(x^*, x_n) = 0$, $\lim\limits_{n\to\infty} d(x_n, x_{n+1}) = 0$ and $\min\{\beta, \gamma\} < \frac{1}{s}$, we have $d(x^*, Tx^*) = 0$ i. e., $Tx^* = x^*$.

For uniqueness, let y^* be another fixed point of T. Then it follows from (2.1) that

$$\begin{aligned} d(x^*, y^*) &= d(Tx^*, Ty^*) \le \alpha d(x^*, y^*) + \beta d(x^*, Tx^*) + \gamma d(y^*, Ty^*) \\ &= \alpha d(x^*, y^*) < d(x^*, y^*) \end{aligned}$$

is a contradiction. Therefore, we must have $d(x^*, y^*) = 0$, i.e., $x^* = y^*$. □

Remark 2.2. *Every metric space is a rectangular b-metric space, but the converse is not true in general (see [5]). We obtain that Theorem 2.1 provides a generalization of Reich Principle Contraction.*

Remark 2.3. *Additionally, if for each $y \in X$ the function $x \mapsto d(x, y)$ is lower semicontinuous from Theorem 2.1 then for x^* for which $x^* = \lim_{n\to\infty} T^n x_0$ the next estimate holds*

$$d(x^*, x_n) \le \frac{sk^n}{1 - k^{n_0} s}[d(x_0, x_{n_0}) + (n + (n + n_0)k^{n_0})d(x_0, x_1)], \tag{2.12}$$

where $n_0 \in \mathbb{N}$ such that $0 < \lambda^{n_0} \cdot b^2 < 1$ and $k = \max\{\alpha, \beta, \gamma, \frac{\alpha+\gamma}{1-\beta}\}$.

Example 2.4. *Let $X = [0, 2]$, $d(x, y) = (x - y)^2$ for all $x, y \in X$ and $T : X \to X$ be defined by*

$$Tx = \begin{cases} \frac{x}{2} & x \in [0, 1], \\ \frac{x}{3} & x \in (1, 2]. \end{cases}$$

Then

1. *From inequality*

$$\left(\frac{a+b+c}{3}\right)^2 \leq \frac{a^2+b^2+c^2}{3},$$

for all $a, b, c \in [0, \infty)$, *we obtain that* (X, d) *is a complete rectangular b-metric space with coefficient* $s = 3$.

2. *There exist* $\alpha, \beta, \gamma \geq 0, \frac{1}{3} < \alpha + \beta + \gamma < 1, \min\{\beta, \gamma\} < \frac{1}{3}$ $(\alpha = \beta = \gamma = \frac{2}{7})$ *such that* T *satisfies the contraction condition (2.1) in Theorem 2.1.*

From Theorem 2.1 we obtain the following variant of Banach contraction principle in b-rectangular metric spaces.

Theorem 2.5. *[7] Let* (X, d) *be a complete rectangular b-metric space with coefficient* $s > 1$ *and* $T : X \to X$ *be a mapping satisfying:*

$$d(Tx, Ty) \leq \alpha d(x, y) \tag{2.13}$$

for all $x, y \in X$, *where* $\alpha \in (0, 1)$. *Then* T *has a unique fixed point* x^* *and* $\lim_{n\to\infty} T^n x = x^*$, *for all* $x \in X$.

In the next Theorem we show inequality

$$d(x^*, x_0) \leq \frac{s}{1-\lambda s}[d(x_0, Tx_0) + d(Tx_0, T^2x_0)], \tag{2.14}$$

if $\lambda < \frac{1}{s}$.
In the rectangular b-metric space (X, d), let $B[x, r]$ denote the closed ball with centre x and radius r.

Theorem 2.6. *If* (X, d) *is a complete rectangular b-metric space with coefficient* $s > 1$ *and* $T : X \to X$ *is a contraction mapping, then* T *has a unique fixed point* x^*, *and for any* $x_0 \in X$ *the sequence* $T^n x_0$ *converges to* x^*. *If* $0 < \lambda s < 1$, *then* $x^* \in B[x_0, r]$, *where* $r = \frac{s}{1-\lambda s}[d(x_0, Tx_0) + d(Tx_0, T^2x_0)]$.

Proof: We show that $T : B[x_0, r] \to B[x_0, r]$. Let $x \in B[x_0, r]$. Then

$$\begin{aligned}
d(Tx, x_0) &\leq s[d(Tx, Tx_0) + d(Tx_0, T^2x_0) + d(T^{x_0}, x_0)] \\
&\leq s[\lambda d(x, x_0) + d(Tx_0, T^2x_0) + d(T^2x_0, x_0)] \\
&\leq s[\frac{\lambda s}{1-\lambda s}[d(x_0, Tx_0) + d(Tx_0, T^2x_0)] \\
&+ d(x_0, Tx_0) + d(Tx_0, x_0)] \\
&= \frac{s}{1-\lambda s}[d(x_0, Tx_0) + d(Tx_0, T^2x_0)] = r.
\end{aligned}$$

By the Theorem 2.5, the result follows. □

Example 2.7. *Let* $X = \mathbb{R}$, $d(x,y) = (x-y)^2$ *for all* $x, y \in X$ *and* $T : X \to X$ *be defined by* $Tx = \sqrt{\frac{2}{3}}x$. *Then* (X,d) *is a complete rectangular b-metric space with coefficient* $s = 3$. *Corollary 2.5 is applicable taking* $\lambda = \frac{2}{3}$. *On the other hand, Theorem 1.3 is not applicable since condition (1.1) implies* $\frac{2}{3} \le \lambda$ *and* $\lambda \in [0, \frac{1}{s}]$ *implies* $\lambda \le \frac{1}{3}$.

Remark 2.8. *Theorem 2.5 provides a complete solution to an open problem 1 raised by George et al. in [5].*

Also, from Theorem 2.1 we obtain the Kannan theorem [6] in b-rectangular metric spaces.

Corollary 2.9. *Let* (X,d) *be a complete rectangular b-metric space with coefficient* $s > 1$ *and* $T : X \to X$ *be a mapping satisfying:*

$$d(Tx,Ty) \le \beta d(x,Tx) + \gamma d(y,Ty) \tag{2.15}$$

for all $x, y \in X$, *where* β, γ *nonnegative constants with* $\beta + \gamma < 1$ *and* $\min\{\beta, \gamma\} < \frac{1}{s}$. *Then* T *has a unique fixed point.*

From Corollary 2.9 we obtain the next generalization of Theorem 3.2 in [5].

Corollary 2.10. *Let* (X,d) *be a complete rectangular b-metric space with coefficient* $s > 1$ *and* $T : X \to X$ *be a mapping satisfying:*

$$d(Tx,Ty) \le \lambda[d(x,Tx) + d(y,Ty)] \tag{2.16}$$

for all $x, y \in X$, *where* $\lambda \in [0, \min\{\frac{1}{2}, \frac{1}{s}\})$. *Then* T *has a unique fixed point.*

From Theorem 2.1 we obtain the following variant of Reich-theorem in rectangular b-metric spaces.

Corollary 2.11. *Let* (X,d) *be a complete rectangular b-metric space with coefficient* $s > 1$ *and* $T : X \to X$ *be a mapping satisfying:*

$$d(Tx,Ty) \le ad(x,y) + b[d(x,Tx) + d(y,Ty)] \tag{2.17}$$

for all $x, y \in X$, *where* a, b *are nonnegative constants with* $a + 2b < 1$ *and* $b < \frac{1}{s}$. *Then* T *has a unique fixed point* x^* *and for each* $x \in X$ *the Picard sequence* $\{T^n x\}$ *converges to* x^* *in* (X,d).

Example 2.12. *Let* $X = \{0, 1, \frac{5}{2}, 3\}, d(x,y) = (x-y)^2$ *for all* $x, y \in X$ *and* $T : X \to X$ *be defined by* $T(0) = \frac{5}{2}, T(1) = T(\frac{5}{2}) = 1, T(3) = 0$. *Then* (X,d) *is a complete rectangular b-metric space with coefficient* $s = 3$. *Corollary 2.11 is applicable with* $a = 0.4$ *and* $b = 0.299$ *and 1 is the unique fixed point of* T. *However, Corollary 2.4 of Ding et al [4] is not applicable as* $d(T0, T3) > ad(x,y) + b[d(x,Tx) + d(y,Ty)]$ *for any* $a + 2b < \frac{1}{3}$.

Remark 2.13. *In view of above example we see that Theorem 2.1 and Corollary 2.4 are generalized versions of Corollary 2.11 of [4] in the setting of rectangular b-metric spaces.*

3. A possibly more general theorem

In this section we prove Theorem 2.1 without assumption (RbM2).

Definition 3.1. *Let X be a nonempty set. A mapping $d : X \times X \to [0, \infty)$ is called an almost-rectangular b-metric on X if d satisfies the conditions (RbM1) and (RbM3) stated in Definition 1.1 and, in addition, satisfies*
(RbM2') $d(x_n, x) \to 0 \Rightarrow d(x, x_n) \to 0$.

Theorem 3.2. *Let (X, d) be a complete almost-rectangular b-metric space with coefficient $s > 1$ and $T : X \to X$ be a mapping satisfying:*

$$d(Tx, Ty) \leq \alpha d(x, y) + \beta d(x, Tx) + \gamma d(Ty, y) \tag{3.1}$$

for all $x, y \in X$, where α, β, γ are nonnegative constants with

$$\alpha + 2\max\{\beta, \gamma\} < 1 \text{ and } \max\{\beta, \gamma\} < \frac{1}{s}. \tag{3.2}$$

Then T has a unique fixed point x^* and $\lim_{n\to\infty} T^n x = x^*$, for all $x \in X$.

Proof: Define a new rectangular b-metric on X by

$$\rho(x, y) = \frac{d(x, y) + d(y, x)}{2}.$$

It is easy to check that ρ is a rectangular b-metric on X with coefficient s. Indeed, the less obvious task is the verification of (RbM3). To check it, pick any $x, y \in X$ and fixe distinct points $u, v \in X \backslash \{x, y\}$. Then, from

$$d(x, y) \leq s[d(x, u) + d(u, v) + d(v, y)]$$

and

$$d(y, x) \leq s[d(y, v) + d(v, u) + d(u, x)]$$

one has

$$\begin{aligned}
\rho(x, y) &= \frac{d(x, y) + d(y, x)}{2} \\
&\leq s\left[\frac{d(x, u) + d(u, x)}{2} + \frac{d(u, v) + d(v, u)}{2} + \frac{d(v, y) + d(y, v)}{2}\right] \\
&= s[\rho(x, u) + \rho(u, v) + \rho(v, y)].
\end{aligned}$$

In addition, direct calculation shows

$$\rho(Tx, Ty) \leq \alpha\rho(x, y) + \max\{\beta, \gamma\}\rho(x, Tx) + \max\{\beta, \gamma\}\rho(y, Ty)$$

for all $x, y \in X$. Notice further that 3.2 implies

$$\min\{\max\{\beta, \gamma\}, \max\{\beta, \gamma\}\} = \max\{\beta, \gamma\} < \frac{1}{s}$$

and

$$\alpha + \max\{\beta, \gamma\} + \max\{\beta, \gamma\} < 1.$$

A direct calculation using property (RbM2') shows that (X, ρ) is complete. Therefore, by Theorem 2.1 T has a unique fixed point $x^* \in X$ such that $\lim_{n\to\infty} T^n x = x^*$ for all $x \in X$. $\square$

From Theorem 3.2 above, one obtains the following more general form of Theorem 2.5.

Theorem 3.3. *Let (X, d) be a complete almost-rectangular b-metric space with coefficient $s > 1$ and $T : X \to X$ be a mapping satisfying:*

$$d(Tx, Ty) \le \alpha d(x, y) \tag{3.3}$$

for all $x, y \in X$, where $\alpha \in (0, 1)$. Then T has a unique fixed point x^* and $\lim_{n\to\infty} T^n x = x^*$, for all $x \in X$.

Remark 3.4. *Observe the curious fact in these results: the function d does not need to satisfy the symmetry condition (RbM2).*

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References

1. I. A. Bakhtin, *The contraction mapping principle in quasimetric spaces*, Funct. Anal., Ulianowsk Gos. Ped. Inst., **30** (1989), 26-37.

2. S. Czerwik, *Contraction mappings in b-metric spaces*, Acta Math. Inform. Univ. Ostrav., **1** (1993), 5-11.

3. H-S. Ding, M. Imdad, S. Radenović, J. Vujaković,*On some fixed point results in b-metric, rectangular and b-rectangular metric spaces.* Arab J. Math. Sci. **22(2)**, (2016), 151-164.

4. H.S. Ding, V. Ozturk, S. Radenović,*On some new fixed point results in b-rectangular metric spaces* J. Nonlinear Sci. Appl., 8 (2015), 378–386.

5. R. George, S. Radenović, K. P. Reshma, S. Shukla, *Rectangular b-metric space and contraction principles*, J. Nonlinear Sci. Appl. **8** (2015), 1005-1013.

6. R. Kannan, *Some results on fixed points*, Bull. Calcutta Math. Soc. **60**, (1968), 71-76.

7. Z. D. Mitrović, *On an open problem in rectangular b-metric space*, *J. Anal.*, **25**, No. 1, (2017), 135-137.

8. S. Reich, *Some remarks concerning contraction mappings*, Canad. Math. Bull., **14** (1971), 121-124.

9. J. R. Roshan, V, Parvaneh, Z. Kadelburg, N. Hussain,*New fixed point results in b-rectangular metric spaces*, Nonlinear Anal., Model. Control, **21(5)**, (2016), 614-634.

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