# MUHAMMAD ZAFRULLAH

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## EDUCATION

1974 Ph. D. (Mathematics) University of London (Thesis Advisor: P. M. Cohn)
1969 M. Sc. (Mathematics) University of the Punjab Lahore, Pakistan
1967 B. Sc. (Mathematics and Physics) University of the Punjab, Lahore, Pakistan

## PROFESSIONAL EXPERIENCE

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| 2010-2011 | Visiting Professor, The University of Iowa, Iowa City, IA |
| 2008- | Affiliate faculty, Idaho State University, Pocatello, ID |
| 2000-2004 | Visiting Assistant Professor, Idaho State University, Pocatello, ID |
| 1999-2000 | Lecturer, The University of Arkansas, Fayetteville, AR |
| 1998 Fall | Visiting Associate Professor, University of Iowa, Iowa City, IA |
| 1998 Spring | Part-time instructor, Mount Mercy College, Cedar Rapids, IA |
| 1997 Fall | Visiting Associate Professor, The University of Iowa, Iowa City, IA |
| 1997 Spring | Part-time Instructor, Bowie State University, Bowie, MD |
| 1996 Fall | Part-time Instructor, Bowie State University, Bowie, MD |
| 1989-92 | Associate Professor, Winthrop University, Rock Hill, SC |
| 1989 Spring | Visiting Associate Professor, The University of Iowa, Iowa City, IA |
| 1988 Fall | Visitor, Florida State University, Tallahassee, Florida |
| 1987-88 | Visitor, University of North Carolina at Charlotte, Charlotte, NC |
| 1985-87 | Honorary Research Fellow, University College London, London, UK |
| 1984-85 | Associate Professor, Al- Faateh University, Tripoli, Libya |
| 1982-84 | Associate Professor, University of Sebha, Sebha, Libya |
| 1977-82 | Assistant Professor, University of Sebha, Sebha, Libya |
| 1975-77 | Demonstrator, UMIST, Manchester, UK |

## PROFESSIONAL SERVICES

I reviewed for Zentralblatt MATH but retired recently, due to illness.
Did review, also, for Mathematical Reviews but then resigned. See letter from AMS at:
www.lohar.com/Letter%20from%20AMS.pdf

Referee for Mathematical Journals

Outside reviewer of Ph.D. theses

Associate Editor, International Journal of Commutative Ring Theory

## ADMINISTRATIVE EXPERIENCE

Chairman of the Department of Mathematics, University of Sebha, Sebha, Libya: from 1978 to 1983.

At Winthrop University I served on the Seminar Committee and the Winthrop-Wylie Mathematics Tournament Committee.

At the University of Arkansas, I was faculty adviser to a student organization called Pakistan Cultural Club.

## SELECTED CONFERENCES AND VISITS

**Conferences:**

1. **Second Piedmont Mathematics Conference**, held at the University of North Carolina at Charlotte. (Duration: 3-13 87 to 3-14 8.) I gave a talk on the work that later developed into [24]. (A number in brackets such as this refers to the ordinal position of the paper in the list of my publications in My Research.)
2. **841st AMS meeting** at the University of Tennessee at Knoxville, TN. (Duration: 3-24-88 to 3-27-88). Evan Houston gave a talk on [21].
3. **861st AMS meeting** held at Denton Texas in November 1990. Presented a paper on t-class groups and Nagata's class group Theorem. The work later appeared as [47].
4. **Colloque International d'Algebre Commutative**, held at the University of Fez Morocco. (Duration: 4-20-92 to 4-24-92) Gave a talk on t-invertibility especially highlighting the elements whose presence in an ideal ensures its invertibility (or t-invertibility). This work later appeared as [48].
5. **915th AMS Meeting** held at UT Chattanooga TN, in October 1997. Gave a talk on unique factorization in non atomic rings
6. **936th AMS Meeting** held at Wake Forest University, Winston-Salem, NC in October, 1998.
7. **962$^{nd}$ AMS Meeting**, New Orleans, Louisiana, January 2001. Gave a talk on LCM-Splitting Sets in Some Ring Extensions [68]
8. **International Conference on Commutative Ring Theory**, held at the Inha University in Incheon, Korea on May 18-19, 2001. Gave a talk on factorization and splitting sets. The material presented in this talk later developed into [74].
9. **Fourth International Conference, Commutative Ring Theory and Applications,** June 7-12, 2001, held at Fez, Morocco. Gave a plenary talk on Various facets of rings between D[X] and K[X]. Wrote a survey article with the same title. The survey "half appeared" in the conference proceedings, it has appeared in full in Comm. Algebra (see [71]). While in Fez I also served on the jury of Abdeslam Mimouni's thesis. Mimouni is a student of S. Kabbaj, a well-known Moroccan Algebraist.
10. **969$^{th}$ AMS Meeting**, September 21-23, 2001, Columbus, Ohio. I gave a talk on Another look at Nagata Type Theorems. In it I talk on t-LCM Splitting sets and corresponding Nagata type theorems. Most of this material went into [74].

11. **984th AMS Meeting,** March 14-16, 2003, Baton Rouge, Louisiana, gave a talk on A+XB[X] domains and the HFD property. This is joint work with Jim Coykendall and Tiberiu Dumitrescu [81].
12. **994th AMS** meeting, March 12-13, 2004, Tallahassee, Florida, gave a talk on t-splitting sets of ideals and the influence Gilmer and Mott had on this area of research.
13. **Workshop on commutative rings and their modules,** May 30-June 4, 2004, Cortona, Italy, gave a plenary talk on v-coprimality and its applications. The title of the talk was, "What v-coprimality can do for you". I have written a survey article [85] on this topic.

**Visits**:

1. Italy: At the suggestion of Professor Abdus Salam, I visited the International Centre of Theoretical Physics at Triest for a month in 1983. During this stay I attended an activity on dynamical systems, directed by Professors Jaco Palis and E.C. Zeeman, wrote [18] and gave the opening talk in a Forum on "Mathematics in the Third World". (The discussion was suggested by Prof. Salam.)
2. Italy: Professor Marco Fontana of Istituto Matematico Universita di Roma invited me, in 1985, to visit for a week. I gave a talk there and wrote [19].
3. France: Professor Alain Bouvier of Universite Claude Bernard, Lyon, France, invited me, in 1986, to visit for ten days. Gave several talks, discussed with Bouvier's students their future work. In Lyon, I met several Moroccan Students. Later some of them, such as Salah Kabbaj, and their students, worked on topics of research of interest to me and furthered my work.
4. US: Professor Joe Mott of Florida State University, Tallahassee Florida invited me to visit and give a Talk at his department. This visit turned into a tour of several universities including The University of Iowa, Iowa City, IA, the University of Tennessee at Knoxville, TN and the University of Virginia at Charlottesville, VA. I gave talks at all these places over a period of some twenty days and wrote or planned a number of papers.
5. Morocco: While in Morocco, in June 2001, I visited Universite Qadi Ayyad, Marrakech to serve as a member of jury on Said el Baghdadi's thesis.
6. China: Dr. Yi Chuan Yang invited me to visit the Beihang University from May 21 to June 22, 2010. While I was in Beijing I gave talks and worked on [103]. I also spent a week in Chengdu, at the invitation of Professor Wang Fanggui at Sichuan Normal University, and gave talks.

## RESEARCH PUBLICATIONS


[1]. A note on two generated finite groups with two defining relations, Punjab Univ. J. Math. (Lahore) 4(1971), 67-68.
[2]. On the evaluation of a certain arithmetical function, J. Natur. Sci. and Math. 12(1972), 363-365 (with S.M. Kerawala).
[3]. Semirigid GCD-domains, Manuscripta Math. 17(1975), 55-66.

[4]. The construction $D + XD_S[X]$, J. Algebra 53(1978), 423-439 (with D.L. Costa and J.L. Mott).
[5]. On a result of Gilmer, J. London Math. Soc. 16 (1977), 19-20.
[6]. Rigid elements in GCD domains, J. Natur. Sci. and Math. 17(1977), 7-14.
[7]. On unique representation domains, J. Natur. Sci. and Math. 18(1978), 19-29.
[8]. On finite conductor domains, Manuscripta Math. 24(1978), 191-204.
[9]. On Prüfer v-multiplication domains, Manuscripta Math. 35(1981), 1-26 (with J.L. Mott).
[10]. Some polynomial characterizations of Prüfer v-multiplication domains, J. Pure Appl. Algebra 32 (1984), 231-237.
[11]. The v-operation and intersections of quotient rings of integral domains, Comm. Algebra 13(1985) 1699-1712.
[12]. A general theory of almost factoriality, Manuscripta Math. 51(1985), 29-62.
[13]. Overrings and dimensions of general D+ M constructions, J. Natur. Sci. and Math. 26(2) (1986), 7-14 (with D.L. Costa and J.L. Mott ).
[14]. The GCD property and irreducible quadratic polynomials, International J. Math. 9(1986), 749-752 (with S.B. Malik and J.L. Mott).
[15]. On generalized Dedekind domains, Mathematika 33(1986), 285-296.
[16]. On a property of pre-Schreier domains, Comm. Algebra 15(1987), 1895-1920.
[17]. On t-invertibility, Comm. Algebra 16(1988), 149-170 (with S.B. Malik and J.L. Mott).
[18]. The $D + XD_S[X]$ construction from GCD-domains, J. Pure Appl. Algebra 50(1988), 93-107.
[19]. Two characterizations of Mori domains, Math. Japonica 33(1988), 645-652.
[20]. On generalized multiplicative functions I, J. Natur. Sci. and Math. 28(1988), 257-268.
[21]. Integral domains in which each t-ideal is divisorial, Michigan Math. J. 35(1988), 291-300 (with E. Houston).
[22]. Ascending chain conditions and star operations, Comm. Algebra 17(6) (1989), 1523-1533.
[23]. Some characterizations of v-domains and related questions, Colloq. Math. Vol. LVIII (1989), 1-9 (with D.D. Anderson, D.F. Anderson, D. Costa, D. Dobbs and J.L. Mott).
[24]. Some quotient based characterizations of domains of multiplicative ideal theory, Bull. Math. Ital. (7) 3-B (1989), 455-476 (with D.D. Anderson and J.L. Mott).
[25]. On t-invertibility II, Comm. Algebra 17(8) (1989), 1955-1969 (with E. Houston).
[26]. t-linked overrings and Prüfer v-multiplication domains, Comm. Algebra 17(11) (1989), 2635-2852 (with D. Dobbs, E. Houston and T. Lucas).
[27]. On some class groups of an integral domain, Bull. Soc. Math. Grece. 29(1988), 45-59 (with A. Bouvier).
[28]. Unruly Hilbert domains, Canad. Bull. Math. 33(1) (1990), 106-109 (with J.L. Mott).
[29]. Well behaved prime t-ideals, J. Pure Appl. Algebra 65(1990), 199-207.
[30]. Contents of polynomials and invertibility, Comm. Algebra 18(5) (1990), 1569-1583 (with J.L. Mott and B. Nashier).
[31]. Flatness and invertibility of ideals, Comm. Algebra 18(7)(1990), 2151-2158.

[32].t-linked overrings as intersections of localizations, Proc. Amer. Math. Soc. 109(3)(1990), 637-646 (with D. Dobbs, E. Houston and T. Lucas).
[33].Weakly factorial domains and groups of divisibility, Proc. Amer. Math. Soc. 109(4)(1990), 907-913 (with D.D. Anderson).
[34].Factoriality in partially ordered groups, Comm. Algebra 18(5)(1990), 1307-1322.
[35].On almost Bezout domains, J. Algebra 142(1991), 285-309 (with D.D. Anderson).
[36].On pseudo integrality, Canad. Math. Bull. 34(1)(1991), 15-22 (with D.F. Anderson and E. Houston).
[37].Factorization in integral domains, J. Pure Appl. Algebra 69(1990),1-19 (with D.D. Anderson and D. F. Anderson).
[38].Rings between D[X] and K[X], Houston J. Math. 17(1)(1991), 109-129 (with D.D. Anderson and D.F. Anderson).
[39].On Krull domains, Archiv der Math. 56(1991), 559-568 (with J.L. Mott).
[40].Splitting the t-class group, J. Pure Appl. Algebra 74(1991), 17-37 (with D.D. Anderson and D.F. Anderson).
[41].t-linked overrings of Noetherian weakly factorial domains, Proc. Amer. Math. Soc. 115(3)(1992), 601-604 (with M. Martin).
[42].Factorization in integral domains II, J. Algebra 152(1992), 78-93 (with D.D. Anderson and D.F. Anderson).
[43].Finite character representations for integral domains, Bull. Math. Ital. (7) 6-B(1992), 613-630 (with D.D. Anderson and J.L. Mott).
[44].On t-linked overrings, Comm. Algebra 20(5)(1992), 1463-1488 (with D. Dobbs, E. Houston, T. Lucas and M. Roitman).
[45]. Atomic domains in which almost all atoms are primes, Comm. Algebra 20(5)(1992), 1447-1462 (with D.D. Anderson and D.F. Anderson).
[46]. On t-invertibility III, Comm. Algebra 21(1993), 1189-1201 (with D.D. Anderson).
[47].t-linked extensions, the t-class group and Nagata's Theorem, J. Pure Appl. Algebra 86(1993), 109-124 (with D.D. Anderson and E. Houston).
[48].On t-invertibility and comparability, *Commutative Ring* Theory (eds. P.-J. Cahen, D. Costa, M. Fontana and S.-E. Kabbaj), Marcel Dekker, New York, 1994, 141-150 (with R. Gilmer and J. Mott).
[49].Some locally trivial star theoretic properties of integral domains, *Commutative Ring* Theory (eds. P.-J. Cahen, D. Costa, M. Fontana and S.-E. Kabbaj), Marcel Dekker, New York, 1994, 87-96 (with D. Dobbs).
[50].A note on Riesz groups, Manuscripta Math. 80(1993), 225-238.
[51].A note on triangular numbers, Punjab. Univ. J. Math. 26( 1993), 75-83 (with H. Lee).
[52].On a theorem of Kaplansky, Bolletino U.M.I. (7) 8-A (1994), 397-402 (with D.D. Anderson).
[53].P.M. Cohn's completely primal elements, *Zero-Dimensional Commutative Rings* (eds. D.F. Anderson and D. Dobbs) Marcel Dekker, New York, 1995, 115-123 (with D.D. Anderson).
[54].On generalized unique factorization, Bollettino U. M. I. (7) 9-A (1995), 401-413 (with D.D. Anderson and D.F. Anderson).
[55].On agreeable domains, Comm. Algebra 23 (13) (1995), 4861-4883 (with D.D. Anderson and D. J. Kwak).

[56].Examples in modern algebra with which students can play, Primus 6 No. 4, (1996), 351-354 (with T. Jackson).
[57].On t-invertibility IV, *Factorization in Integral Domains* (ed. D.D. Anderson) Marcel Dekker, New York, 1997, 221-225 (with D.D. Anderson).
[58].Criteria for unique factorization in integral domains, J. Pure Appl. Algebra, 127(1998), 205-218 (with D.D. Anderson, S. T. Chapman and F.Halter-Koch)
[59].Unique factorization in non-atomic integral domains, Bollettino U. M. I 8(2-B) (1999) 341-352 (with D.D. Anderson and J.L. Mott).
[60].Star operations and primitive polynomials, Comm. Algebra 27(7)(1999) 3137-3142 (with D.D. Anderson).
[61]. Independent locally finite intersections of localizations, Houston J. Math. 25(1999) 433-452 (with D. D. Anderson)
[62]. Integral domains whose over-rings satisfy ACC on principal ideals, Comm. Algebra 28(9)(2000), 4403-4409. (with T. Dumitrescu and Tariq Shah).
[63]. Splitting multiplicative sets Proc. Amer. Math. Soc. 129(2001) (8), 2209-2217 (with D. D. Anderson).
[64]. Putting t-invertibility to use, *Non-Noetherian commutative ring theory,* 429-457, Math. Appl., 520, *Kluwer Acad. Publ., Dordrecht,* 2000.
[65]. Primes that become primal in a pullback, Internat. J. Comm. Ring Theory (*Commutative rings)* 201-212, *Nova Sci. Publ., Hauppauge, NY,* 2002. (with T. Dumitrescu and N. Radu).
[66]. The ring D+XD[1/S][X] and t-splitting sets, Commutative algebra. *Arab. J. Sci. Eng. Sect. C Theme Issues* **26** (2001), no. 1, 3--16. (with D. D. Anderson and D.F. Anderson) )
[67]. Distinguished domains, *Commutative rings,* 159--166, *Nova Sci. Publ., Hauppauge, NY,* 2002. (with D.D. Anderson and D.J. Kwak).
[68]. LCM-splitting sets in some ring extensions *Proc. Amer. Math. Soc.* 130 (2002), no. 6, 1639—1644 (with T. Dumitrescu).
[69]. Almost GCD domains of finite t-character, J. Algebra 245(2001) no 1, 161-181 (with T. Dumitrescu, Y. Lequain and J. Mott)
[70]. Various facets of rings between D[X] and K[X], a survey article that has "half appeared" in the proceedings of the 2001 Fez Conference (Lecture notes in Pure and Applied Mathematics Volume 231, pp (Marcel-Dekker 2002), under the nonsensical title, "Facets on rings between D[X] and K[X]". The paper has appeared as indicated below. I am treating it as two papers because apparently Math. Reviews have done that.
[71]. Various facets of rings between D[X] and K[X], Comm. Algebra 31(5) (2003) 2494-2540.
[72].On a property of weakly Krull domains, Proc. Amer. Soc. 131(12) (2003) 3689-3692 (with D.D. Anderson).
[73].Almost Splitting Sets and AGCD Domains, Comm. Algebra, 32(1)(2004), 147-158 (with D. D. Anderson and T. Dumitrescu).
[74]. Factorization of certain sets of polynomials in an integral domain, Internat. J. Comm. Ring Theory, 2(2003) (with D.D. Anderson and Pramod K. Sharma)
[75]. *t*-Splitting sets in integral domains, J. Pure Appl. Algebra 187, No.1-3, 71-86 (2004). (with G.W. Chang and T. Dumitrescu).

[76]. AP domains and unique factorization, J. Pure Appl. Algebra 189, No.1-3, 27-35 (2004) (with James Coykendall).
[77]. UMV domains, *Arithmetical properties of commutative rings and monoids*, 304-315, Lect. Notes Pure Appl. Math., 241, *Chapman & Hall/CRC, Boca Raton, FL,* 2005 (with Evan Houston).
[78]. Weakly Krull inside factorial domains, *Arithmetical properties of commutative rings and monoids,* 172--179, Lect. Notes Pure Appl. Math., 241, *Chapman & Hall/CRC, Boca Raton, FL,* 2005 (with D.D. Anderson and G.W. Chang).
[79]. A note on almost GCD monoids, Semigroup Forum Volume 69, Number 1(2004), 141-154 (with DD Anderson).
[80] *t*-splitting sets of ideals, J. Pure Appl. Algebra 197(1-3)(2005) 239-248. (with Gyu Whan Chang and T. Dumitrescu)
[81] The half factorial property and the domains of the form A+XB[X], Houston J. Math. 32(1)(2006) 33-46 (with J. Coykendall and T. Dumitrescu)
[82] The w-integral closure of integral domains. J. Algebra 295(1)(2006) 195-210. (with G. W. Chang).
[83] The Schreier Property and Gauss' Lemma (with D.D. Anderson) Bollettino U. M. I. (8) 10-B (2007), 43-62.
[84] Quasi Schreier domains II (with D.D Anderson and T. Dumitrescu) Comm. Algebra 35(7)(2007), 2096-2104.
[85] What v-coprimality can do for you, *Multiplicative ideal theory in commutative algebra,* 387--404, *Springer, New York,* 2006.
[86] Pseudo almost integral elements Comm. Algebra 35(4)(2007), 1127-1131. (with D. D Anderson)
[87] Monoid domain constructions of antimatter domains, (with D.D. Anderson, L. Hill and J. Coykendall) Comm. Algebra 35(10)(2007), 32-36.
[88] Factoriality in Riesz groups (with J.L. Mott and Munir A. Rashid) J. Group Theory 11(1)(2008), 23-41.
[89] Unique representation domains II (with S. El-Baghdadi and S. Gabelli) J. Pure Appl. Algebra 212(2)(2008), 376-393.
[90] Some remarks on Prufer *-multiplication domains and class groups (with D.F. Anderson and M. Fontana) J. Algebra 319(1)(2008), 272-295.
[91] Almost Bezout domains, III (with Dan Anderson), Bull. Math. Soc. Sci. Math. Roumanie Tome 51(99) No. 1 (2008), 3-9.
[92] A simple application of Zorn's Lemma (with D.D. Anderson and D. Dobbs) Tamkang J. Math. 40(2)(2009), 139-150.
[93] On v-domains and star operations, (with D.D. Anderson, D.F. Anderson and M. Fontana), Comm. Algebra 37(2009) 1-26.
[94] On v-domains, a survey, in Commutative Algebra, Noetherian and non-Noetherian perspectives, (Editors: Fontana, Kabbaj, Olberding and Swanson) pp. 145-179, Springer 2011.
[95] Splitting sets and weakly Matlis domains (with Dan Anderson) *Commutative algebra and its applications,* 1–8, *Walter de Gruyter, Berlin,* 2009.
[96] t-invertibility and Bazzoni-like Statements, J. Pure Appl. Algebra J. Pure Appl. Algebra 214(2010), 654-657.

[97] Domains in which nonzero locally principal ideals are invertible (with D.D. Anderson) *Comm. Algebra* 39 (2011), no. 3, 933–941.
[98] A v-operation free' approach to Prüfer v-multiplication domains. Int J. Math. Sci.2009, Art. ID 349010 (with M. Fontana).
[99] t- Schreier domains (with T. Dumitrescu) Comm. Algebra 39 (2011), no. 3, 808--818.
[100] Characterizing domains of finite *-character, J. Pure Appl. Algebra 214 (2010), 2087-2091) (with T. Dumitrescu).
[101] *-Finite ideals contained in infinitely many *s-maximal ideals, Rendiconti del Circolo Matematico di Palermo, 2011, Volume 60, Number 3, Pages 319-322 (with Dan Anderson).
[102] The v-operation in extensions of integral domains, J. Algebra Appl., 11 (2012), no. 1, 1250007, 18 pp (with David Anderson and said El-Baghdadi)
[103] Bases of pre-Riesz groups and Conrad's F-condition, Arabian Journal for Science and Engineering, 2011, Volume 36, Number 6, Pages 1047-1061 (with Y.C. Yang).
[104] Integral domains of finite t-character, J. Algebra, 396 (2013) 169—183. (With D.D. Anderson and G.W. Chang)
[105] Corrigendum to "Integral domains of finite t-character", [J. Algebra 396 (2013) 169--183], J. Algebra 405 (2014), 35--37. (With D.D. Anderson and G.W. Chang)
[106] Studying monoids is not enough to study multiplicative properties of rings: an elementary approach, Arabian Journal of Mathematics (to appear) (With M. Fontana)

[107] Integral domains in which any two v-coprime elements are comaximal J. Algebra *Volume 423, (2015), 93-113.* (with Evan Houston)

[108] Nagata-like theorems for integral domains of finite character and finite t-character J. Algebra and Applications (to appear) (with D.D. Anderson and G. W. Chang)

[109] Locally GCD domains and the ring D + XD_S [X], Bulletin Iranian Math. Soc. 42(2) (2016), 263-284 (with G.W. Chang and T. Dumitrescu)

[110] Cohen type theorems in Commutative ring theory, Houston J. Math. (to appear) (with D.D. Anderson).

[111] Intersections of quotient rings and Prufer v-multiplication domains, Journal of Algebra and Applications (to appear) (with S. El-Baghdadi and M. Fontana)
[112] On locally AGCD domains, Journal of Algebra and Applications (to appear) (with David Anderson and Gyu Whan Chang)
[113] Completely integrally closed Prufer v-multiplication domains, Comm. Algebra (45 (12) (2017) 5264-5282) (with Daniel and David Anderson).
[114] Graded Prufer domains, Comm. Algebra (to appear) (with David Anderson and G.W. Chang)
[115] *-super potent domains, J. Commutative Algebra (to appear) (with Evan Houston)

[116] On S-GCD domains, J. Alg. Appl. (to appear) (With Dan Anderson and Ahmed Hamed)
[117] On the structure of *-power conductor domains, Comm. Algebra (to appear.) (With Evan Houston and Dan Anderson).
[118] On *-semi homogeneous domains (David Anderson Volume) (to appear.) (With Dan Anderson).
[119] On t-local domains and valuation domains (David Anderson Volume)(to appear.) (With Marco Fontana).

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