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Todorcevic orderings as examples of ccc forcings without adding random reals

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Abstract: In [*Two examples of Borel partially ordered sets with the countable chain condition*, Proc. Amer. Math. Soc. **112** (1991), no. 4, 1125–1128], Todorcevic introduced a ccc forcing which is Borel definable in a separable metric space. In [*On Todorcevic* orderings, Fund. Math., to appear], Balcar, Pazák and Thümmel applied it to more general topological spaces and called such forcings *Todorcevic orderings*. There they analyze Todorcevic orderings quite deeply. A significant remark is that Thümmel solved the problem of Horn and Tarski by use of Todorcevic ordering [*The problem of Horn and Tarski*, Proc. Amer. Math. Soc. **142** (2014), no. 6, 1997–2000]. This paper supplements the analysis of Todorcevic orderings due to Balcar, Pazák and Thümmel in [*On Todorcevic* orderings, Fund. Math., to appear]. More precisely, it is proved that Todorcevic orderings add no random reals whenever they have the countable chain condition.

Keywords: Todorcevic orderings; random reals **AMS Subject Classification:** 03E35, 03E17

References

- Balcar B., Jech T., Weak distributivity, a problem of von Neumann and the mystery of measurability, Bull. Symbolic Logic 12 (2006), no. 2, 241–266.
- [2] Balcar B., Pazák T., Thümmel E., On Todorcevic orderings, Fund. Math., to appear.
- [3] Bartoszyński T., Judah H., Set Theory. On the Structure of the Real Line, A K Peters, Ltd., Wellesley, MA, 1995.
- [4] Dow A., Steprāns J., Countable Fréchet α₁-spaces may be first countable, Arch. Math. Logic 32 (1992), no. 1, 33–50.
- [5] Horn A., Tarski A., Measures in Boolean algebras, Trans. Amer. Math. Soc. 64 (1948), 467–497.
- [6] Judah H., Repický M., No random reals in countable support iterations, Israel J. Math. 92 (1995), no. 1–3, 349–359.
- [7] Larson P., Todorcevic S., Katětov's problem, Trans. Amer. Math. Soc. 354 (2002), no. 5, 1783–1791.
- [8] Osuga N., Kamo S., Many different covering numbers of Yorioka's ideals, Arch. Math. Logic 53 (2014), no. 1–2, 43–56.
- [9] Solovay R., A model of set-theory in which every set of reals is Lebesgue measurable, Ann. of Math. (2) 92 (1970), 1–56.
- [10] Talagrand M., Maharam's problem, Ann. of Math. (2) 168 (2008), no. 3, 981-1009.
- [11] Thümmel E., The problem of Horn and Tarski, Proc. Amer. Math. Soc. 142 (2014), no. 6, 1997–2000.
- [12] Todorcevic S., Partition Problems in Topology, Contemporary Mathematics, 84, American Mathematical Society, Providence, Rhode Island, 1989.
- [13] Todorcevic S., Two examples of Borel partially ordered sets with the countable chain condition, Proc. Amer. Math. Soc. 112 (1991), no. 4, 1125–1128.
- [14] Todorcevic S., A problem of von Neumann and Maharam about algebras supporting continuous submeasures, Fund. Math. 183 (2004), no. 2, 169–183.
- [15] Todorcevic S., A Borel solution to the Horn-Tarski problem, Acta Math. Hungar. 142 (2014), no. 2, 526–533.
- [16] Velickovic B., CCC posets of perfect trees, Compos. Math. 79 (1991), no. 3, 279–294.
- [17] Yorioka T., Some weak fragments of Martin's axiom related to the rectangle refining property, Arch. Math. Logic 47 (2008), no. 1, 79–90.
- [18] Yorioka T., The inequality b > ℵ₁ can be considered as an analogue of Suslin's Hypothesis, Axiomatic Set Theory and Set-theoretic Topology (Kyoto 2007), Sūrikaisekikenkyūsho Kōkyūroku No. 1595 (2008), 84–88.

- [19] Yorioka T., A non-implication between fragments of Martin's Axiom related to a property which comes from Aronszajn trees, Ann. Pure Appl. Logic 161 (2010), no. 4, 469–487.
- [20] Yorioka T., Uniformizing ladder system colorings and the rectangle refining property, Proc. Amer. Math. Soc. 138 (2010), no. 8, 2961–2971.
- [21] Yorioka T., A correction to "A non-implication between fragments of Martin's Axiom related to a property which comes from Aronszajn trees", Ann. Pure Appl. Logic 162 (2011), 752– 754.
- [22] Yorioka T., Keeping the covering number of the null ideal small, preprint, 2013.
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