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Introducing Spans[1]

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Summary. A sequence of internal approximations of simple closed curves is introduced. They are called spans.

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The articles [20], [17], [26], [3], [23], [2], [18], [27], [5], [6], [1], [4], [7], [25], [13], [14], [19], [10], [11], [12], [15], [16], [24], [8], [9], [21], and [22] provide the notation and terminology for this paper.

Let C be a non vertical non horizontal non empty subset of $\mathcal{E}^2_{\mathrm{T}}$ satisfying conditions of simple closed curve and let n be a natural number. Let us assume that n is sufficiently large for C. The functor $\mathrm{Span}(C,n)$ yielding a clockwise oriented standard non constant special circular sequence is defined by the conditions (Def. 1).

(Def. 1)(i) $\mathrm{Span}(C,n)$ is a sequence which elements belong to $\mathrm{Gauge}(C,n)$,

(ii) $(\mathrm{Span}(C,n))_1 = \mathrm{Gauge}(C,n) \circ (\text{X-SpanStart}(C,n), \text{Y-SpanStart}(C,n))$,

(iii) $(\mathrm{Span}(C,n))_2 = \mathrm{Gauge}(C,n) \circ (\text{X-SpanStart}(C,n) -' 1, \text{Y-SpanStart}(C,n))$, and

(iv) for every natural number k such that $1 \leq k$ and $k+2 \leq \operatorname{len}\mathrm{Span}(C,n)$ holds if $\mathrm{front\_right\_cell}(\mathrm{Span}(C,n),k,\mathrm{Gauge}(C,n))$ misses C and $\mathrm{front\_left\_cell}(\mathrm{Span}(C,n),k,\mathrm{Gauge}(C,n))$ misses C, then $\mathrm{Span}(C,n)$ turns left k, $\mathrm{Gauge}(C,n)$ and if $\mathrm{front\_right\_cell}(\mathrm{Span}(C,n),k,\mathrm{Gauge}(C,n))$ misses C and $\mathrm{front\_left\_cell}(\mathrm{Span}(C,n),k,\mathrm{Gauge}(C,n))$ meets C, then $\mathrm{Span}(C,n)$ goes straight k, $\mathrm{Gauge}(C,n)$ and if $\mathrm{front\_right\_cell}(\mathrm{Span}(C,n),k,\mathrm{Gauge}(C,n))$ meets C, then $\mathrm{Span}(C,n)$ turns right k, $\mathrm{Gauge}(C,n)$.

References

[1] Grzegorz Bancerek. Cardinal numbers. *Journal of Formalized Mathematics*, 1, 1989. http://mizar.org/JFM/Vol1/card_1.html.

[2] Grzegorz Bancerek. The fundamental properties of natural numbers. *Journal of Formalized Mathematics*, 1, 1989. http://mizar.org/JFM/Vol1/nat_1.html.

[3] Grzegorz Bancerek. The ordinal numbers. *Journal of Formalized Mathematics*, 1, 1989. http://mizar.org/JFM/Vol1/ordinal1.html.

[4] Grzegorz Bancerek and Krzysztof Hryniewiecki. Segments of natural numbers and finite sequences. *Journal of Formalized Mathematics*, 1, 1989. http://mizar.org/JFM/Vol1/finseq_1.html.

[5] Czesław Byliński. Functions and their basic properties. *Journal of Formalized Mathematics*, 1, 1989. http://mizar.org/JFM/Vol1/funct_1.html.

[6] Czesław Byliński. Functions from a set to a set. *Journal of Formalized Mathematics*, 1, 1989. http://mizar.org/JFM/Vol1/funct_2.html.

[7] Czesław Byliński. Finite sequences and tuples of elements of a non-empty sets. *Journal of Formalized Mathematics*, 2, 1990. http://mizar.org/JFM/Vol2/finseq_2.html.

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[8] Czesław Byliński. Gauges. *Journal of Formalized Mathematics*, 11, 1999. http://mizar.org/JFM/Vol11/jordan8.html.

[9] Czesław Byliński. Some properties of cells on go board. *Journal of Formalized Mathematics*, 11, 1999. http://mizar.org/JFM/Vol11/gobrd13.html.

[10] Agata Darmochwał. The Euclidean space. *Journal of Formalized Mathematics*, 3, 1991. http://mizar.org/JFM/Vol3/euclid.html.

[11] Agata Darmochwał and Yatsuka Nakamura. The topological space $\mathcal{E}^2_{\mathrm{T}}$. Arcs, line segments and special polygonal arcs. *Journal of Formalized Mathematics*, 3, 1991. http://mizar.org/JFM/Vol3/topreal1.html.

[12] Agata Darmochwał and Yatsuka Nakamura. The topological space $\mathcal{E}^2_{\mathrm{T}}$. Simple closed curves. *Journal of Formalized Mathematics*, 3, 1991. http://mizar.org/JFM/Vol3/topreal2.html.

[13] Katarzyna Jankowska. Matrices. Abelian group of matrices. *Journal of Formalized Mathematics*, 3, 1991. http://mizar.org/JFM/Vol3/matrix_1.html.

[14] Stanisława Kanas, Adam Lecko, and Mariusz Startek. Metric spaces. *Journal of Formalized Mathematics*, 2, 1990. http://mizar.org/JFM/Vol2/metric_1.html.

[15] Jarosław Kotowicz and Yatsuka Nakamura. Introduction to Go-Board — part I. *Journal of Formalized Mathematics*, 4, 1992. http://mizar.org/JFM/Vol4/goboard1.html.

[16] Yatsuka Nakamura and Czesław Byliński. Extremal properties of vertices on special polygons, part I. *Journal of Formalized Mathematics*, 6, 1994. http://mizar.org/JFM/Vol6/sppol_1.html.

[17] Yatsuka Nakamura and Andrzej Trybulec. Decomposing a Go-Board into cells. *Journal of Formalized Mathematics*, 7, 1995. http://mizar.org/JFM/Vol7/goboard5.html.

[18] Takaya Nishiyama and Yasuho Mizuhara. Binary arithmetics. *Journal of Formalized Mathematics*, 5, 1993. http://mizar.org/JFM/Vol5/binarith.html.

[19] Beata Padlewska and Agata Darmochwał. Topological spaces and continuous functions. *Journal of Formalized Mathematics*, 1, 1989. http://mizar.org/JFM/Vol1/pre_topc.html.

[20] Andrzej Trybulec. Tarski Grothendieck set theory. *Journal of Formalized Mathematics*, Axiomatics, 1989. http://mizar.org/JFM/Axiomatics/tarski.html.

[21] Andrzej Trybulec. More on external approximation of a continuum. *Journal of Formalized Mathematics*, 13, 2001. http://mizar.org/JFM/Vol13/jordan1h.html.

[22] Andrzej Trybulec. Preparing the internal approximations of simple closed curves. *Journal of Formalized Mathematics*, 14, 2002. http://mizar.org/JFM/Vol14/jordan11.html.

[23] Andrzej Trybulec. Subsets of real numbers. *Journal of Formalized Mathematics*, Addenda, 2003. http://mizar.org/JFM/Addenda/numbers.html.

[24] Andrzej Trybulec and Yatsuka Nakamura. On the order on a special polygon. *Journal of Formalized Mathematics*, 9, 1997. http://mizar.org/JFM/Vol9/sprect_2.html.

[25] Wojciech A. Trybulec. Pigeon hole principle. *Journal of Formalized Mathematics*, 2, 1990. http://mizar.org/JFM/Vol2/finseq_4.html.

[26] Zinaida Trybulec. Properties of subsets. *Journal of Formalized Mathematics*, 1, 1989. http://mizar.org/JFM/Vol1/subset_1.html.

[27] Edmund Woronowicz. Relations and their basic properties. *Journal of Formalized Mathematics*, 1, 1989. http://mizar.org/JFM/Vol1/relat_1.html.

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