Kan Extensions In Enriched Category Theory

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Category Theory II 4.1: Representable Functors

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Kan Extensions In Enriched Category

Kan extensions are universal constructs in category theory, a branch of mathematics.They are closely related to adjoints, but are also related to limits and ends.They are named after Daniel M. Kan, who constructed certain (Kan) extensions using limits in 1960.. An early use of (what is now known as) a Kan extension from 1956 was in homological algebra to compute derived functors.

Kan extension - Wikipedia

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Kan Extensions in Enriched Category Theory ¦ Eduardo J ...

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Kan extensions in Enriched Category Theory ¦ SpringerLink

The general formulation of pointwise Kan extensions in general enriched contexts is in terms of weighted (co)limits. In the case that the codomain category is (co)tensored these may be expressed equivalently in terms of (co)ends.

Kan extension in nLab

to define limits and colimits of diagrams valued in an 1-category. Thus, pointwise Kan extensions can be used to extend this notion to non-cartesian closed 1-cosmoi, such as sliced1-cosmoiorthe1-cosmoiofRezkobjects. Weintroduceinitial andfinalfunctors ... enriched category Kwhose mapping spaces map(A;B) are all quasi-categories that is ...

KAN EXTENSIONS AND THE CALCULUS OF MODULES FOR -CATEGORIES

This is part 28 of Categories for Programmers. Previously: Kan Extensions.See the Table of Contents.. A category is small if its objects form a set. But we know that there are things larger than sets. Famously, a set of all sets cannot be formed within the standard set theory (the Zermelo-Fraenkel theory, optionally augmented with the Axiom of Choice).

Enriched Categories ¦ Bartosz Milewski's Programming Cafe

Beyond this, the work in 5.11–5.13 on Kan extensions along a non-fully-faithful dense functor seems to be quite new even whenV= Set, as is its application in 6.4; while the whole of Chapter 6 is new in the enriched setting.

BASIC CONCEPTS OF ENRICHED CATEGORY THEORY

and a right adjoint, called respectively the left and the right Kan extension of F. Isbell adjunctions and Kan extensions have also been considered for categories enriched over a symmetric monoidal closed category [Bor1994, DL2007, Kel1982, KS2005, Law1973, Law1986]. In this paper, it is shown that for a small quantaloid Q, each Q-distributor ˚ : A !

Introduction - Lili Shen ¦ Thinking categorically

In particular, taking K K to be \mathbb{Z} (the ring of integers), a ringoid (or Ab-enriched category) is a category enriched over Ab. A (Lawvere) metric space is a category enriched over the poset ([0, ∞], ≥) ([0, \infty], \geq) of extended positive real numbers, where ⊗ \otimes is + +. An ultrametric space is a category enriched over the poset ([0, ∞], ≥) ([0, \infty], \geq) of extended positive real numbers, where ⊗ \otimes is max \max.

enriched category in nLab

In category theory, a branch of mathematics, an enriched category generalizes the idea of a category by replacing hom-sets with objects from a general monoidal category.It is motivated by the observation that, in many practical applications, the hom-set often has additional structure that should be respected, e.g., that of being a vector space of morphisms, or a topological space of morphisms.

Enriched category - Wikipedia

Theory and Applications of Categories, Vol. 30, No. 5, 2015, pp. 86{146. ALGEBRAIC KAN EXTENSIONS IN DOUBLE CATEGORIES SEERP ROALD KOUDENBURG Abstract. We study Kan extensions in

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KF are respectively the left and right Kan extension of Falong K. Isbell adjunctions and Kan extensions have also been considered for cate- gories enriched over a symmetric monoidal closed category [Bor94b, DL07, Dub70, Kel82, KS05, Law73, Law86, Rie14], and will be outlined in Chapter 2. 1.2 Adjoint morphisms in a bicategory

Adjunctions in Quantaloid-enriched Categories

In Section 2 we define Kan extensions and give some basic examples. We will show how limits and colimits are special cases of Kan extensions, and how, when all the extensions exist, they define adjoint functors. In Section 3 we give limit and colimit formulae for Kan extensions, helping to find conditions for when Kan extensions will exist.

All Concepts are Kan Extensions: Kan Extensions as the ...

The Cauchy completion of a category is the universal extension of that category in which all idempotents split. When we move from ordinary categories to enriched categories, it turns out that the appropriate notion of Cauchy completion is given by replacing "splittings of idempotents" with "absolute colimits".

The Kan Extension Seminar - Mathematics

Enriched Categories. Normally, we like to think that there is a set 풞 (A, B) \mathcal{C}(A, B) of arrows between any two objects A A and B B in a category 풞 \mathcal{C}.Composition then can be packaged up into a function 풞 (A, B) × 풞 (B, C) → 풞 (A, C) \mathcal{C}(A, B) \times \mathcal{C}(B, C) \to \mathcal{C}(A, C), satisfying an associativity condition.The identity is an element ...

Enrichment and its Limits ¦ The n-Category Café

Beyond this, the work in 5.11–5.13 on Kan extensions along a non-fully-faithful dense functor seems to be quite new even whenV= Set,asisits application in 6.4; while the whole of Chapter 6 is new in the enriched setting.

BASIC CONCEPTS OF ENRICHED CATEGORY THEORY

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Kan Extensions In Enriched Category Theory

V-category,V-presheaves on aV-category, Kan extensions of enriched functors, Morita theory forV-categories, and so on. Monoidal categories are precisely one-object bicategories [B ´ enabou, 1967]. It is thus naturaltoaskhowfarV-categorytheorycanbegeneralizedtoW-categorytheory, forWa general bicategory.

The original purpose of this paper was to provide suitable enriched completions of small enriched categories.

Introduction to concepts of category theory — categories, functors, natural transformations, the Yoneda lemma, limits and colimits, adjunctions, monads — revisits a broad range of mathematical examples from the categorical perspective. 2016 edition.

The language of ends and (co)ends provides a natural and general way of expressing many phenomena in category theory, in the abstract and in applications. Yet although category-theoretic methods are now widely used by mathematicians, since (co)ends lie just beyond a first course in category theory, they are typically only used by category theorists, for whom they are something of a secret weapon. This book is the first systematic treatment of the theory of (co)ends. Aimed at a wide audience, it presents the (co)end calculus as a powerful tool to clarify and simplify definitions and results in category theory and export them for use in diverse areas of mathematics and computer science. It is organised as an easy-to-cite reference manual, and will be of interest to category theorists and users of category theory alike.

Higher category theory is generally regarded as technical and forbidding, but part of it is considerably more tractable: the theory of infinity-categories, higher categories in which all higher morphisms are assumed to be invertible. In Higher Topos Theory, Jacob Lurie presents the foundations of this theory, using the language of weak Kan complexes introduced by Boardman and Vogt, and shows how existing theorems in algebraic topology can be reformulated and generalized in the theory's new language. The result is a powerful theory with applications in many areas of mathematics. The book's first five chapters give an exposition of the theory of infinity-categories that emphasizes their role as a generalization of ordinary categories. Many of the fundamental ideas from classical category theory are generalized to the infinity-categorical setting, such as limits and colimits, adjoint functors, ind-objects and pro-objects, locally accessible and presentable categories, Grothendieck fibrations, presheaves, and Yoneda's lemma. A sixth chapter presents an infinity-categorical version of the theory of Grothendieck topoi, introducing the notion of an infinity-topos, an infinity-category that resembles the infinity-category of topological spaces in the sense that it satisfies certain axioms that codify some of the basic principles of algebraic topology. A seventh and final chapter presents applications that illustrate connections between the theory of higher topoi and ideas from classical topology.

Category theory provides structure for the mathematical world and is seen everywhere in modern mathematics. With this book, the author bridges the gap between pure category theory and its numerous applications in homotopy theory, providing the necessary background information to make the subject accessible to graduate students or researchers with a background in algebraic topology and algebra. The reader is first introduced to category theory, starting with basic definitions and concepts before progressing to more advanced themes. Concrete examples and exercises illustrate the topics, ranging from colimits to constructions such as the Day convolution product. Part II covers important applications of category theory, giving a thorough introduction to simplicial objects including an account of quasi-categories and Segal sets. Diagram categories play a central role throughout the book, giving rise to models of iterated loop spaces, and feature prominently in functor homology and homology of small categories.

The Handbook of Categorical Algebra is designed to give, in three volumes, a detailed account of what should be known by everybody working in, or using, category theory. As such it will be a unique reference. The volumes are written in sequence. The second, which assumes familiarity with the material in the first, introduces important classes of categories that have played a fundamental role in the subject's development and applications. In addition, after several chapters discussing specific categories, the book develops all the major concepts concerning Benabou's ideas of fibred categories. There is ample material here for a graduate course in category theory, and the book should also serve as a reference for users.

The beginning graduate student in homotopy theory is confronted with a vast literature on spectra that is scattered across books, articles and decades. There is much folklore but very few easy entry points. This comprehensive introduction to stable homotopy theory changes that. It presents the foundations of the subject together in one place for the first time, from the motivating phenomena to the modern theory, at a level suitable for those with only a first course in algebraic topology. Starting from stable homotopy groups and (co)homology theories, the authors study the most important categories of spectra and the stable homotopy category, before moving on to computational aspects and more advanced topics such as monoidal structures, localisations and chromatic homotopy theory. The appendix containing essential facts on model categories, the numerous examples and the suggestions for further reading make this a friendly introduction to an often daunting subject.