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# Generalized bialgebras and triples of operads

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*(Submitted on 28 Nov 2006 (v1), last revised 16 Dec 2008 (this version, v3))*

We introduce the notion of generalized bialgebra, which includes the classical notion of bialgebra (Hopf algebra) and many others. We prove that, under some mild conditions, a connected generalized bialgebra is completely determined by its primitive part. This structure theorem extends the classical Poincaré-Birkhoff-Witt theorem and the Cartier-Milnor-Moore theorem, valid for cocommutative bialgebras, to a large class of generalized bialgebras. Technically we work in the theory of operads which permits us to give a conceptual proof of our main theorem. It unifies several results, generalizing PBW and CMM, scattered in the literature. We treat many explicit

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examples and suggest a few conjectures.

Comments: Slight modification of the quotient triple proposition (3.1.1). Typos corrected. 110 pages

Subjects: **Quantum Algebra (math.QA)**; Combinatorics (math.CO); Category Theory (math.CT)

MSC classes: 16A24, 16W30, 17A30, 18D50, 81R60

Journal reference: Aste'risque 320 (2008), vi+114 pp.

Cite as: [arXiv:math/0611885](https://arxiv.org/abs/math/0611885) [math.QA]  
(or [arXiv:math/0611885v3](https://arxiv.org/abs/math/0611885v3) [math.QA] for this