

1052-18-105

J P May* (may@math.uchicago.edu), Department of Mathematics, The University of Chicago,
1118 E. 58th Street, Chicago, IL 60637. *Six model structures for DG modules over DGA's.*

Let A be a differential graded algebra over a commutative ring R and let $M(A)$ be the category of differential graded (left) A -modules. There are three obvious notions of weak equivalence in $M(A)$: A -homotopy equivalence, R -homotopy equivalence, and quasi-isomorphism. These lead to three triangulated categories. There are (at least) six sensible model category structures on $M(A)$, one, two, and three, respectively, for the three kinds of weak equivalences just named. In one of them, the classical bar construction $B(A,A,X)$ is a model theoretic cofibrant approximation of X . All of these model structures seem natural and interesting. There appear to be many other contexts in algebra and topology where such a sextet of interrelated model structures is present. (Received August 23, 2009)