GW Bibliography

Topological Quantum Field Theory Topological quantum field theory, topological gravity and topological strings were all constructed in a series of papers by E. Witten [1, 2, 3, 4, 5]. The mathematical point of view is studied in [6], and elucidated in [7]. Reviews of TQFT usually appear in the first few sections of reviews on topological strings.

Topological strings While topological strings are constructed for the first time in [2], one can find more details in the early review by Dijkgraaf, Verlinde, Verlinde [8]. The B-model picture was developed and thoroughly explored in the seminal "BCOV paper" by Bershadsky, Cecotti, Ooguri and Vafa [9]. See also [10].

Reviews Reviews of topological string theory usually cover the basics of TQFT, the topological twist, the $\mathcal{N} = (2, 2)$ superconformal algebra and its twisted version [11, 12], Calabi-Yau geometry and maybe some applications to other areas of physics (most notably the geometric engineering of gauge theories and black hole geometries). Some of my favourites include [13] by Mariño -available on his website-, [14], [15]. An exhaustive early review for the mathematically minded reader which fully explores the relation between the physics and math is [16] by Cordes, Moore and Ramgoolam. Highly recommended. If one truly wants to learn string theory and develop some understanding of the framework one should read the wonderful book [17] in its entirety. (If for some reason one is interested in older books one should look into the books by Polchinski and by Green, Schwarz, Witten).

Computation of string amplitudes A topic which was not explored in the talks is how physicists came up with new mathematical tools to compute the topological string amplitudes, and thus solve Gromov-Witten theory. See [18] for an early computation of the genus g amplitudes.

- On the A-model side, we have the topological vertex developed by Aganagic, Klemm, Mariño, Vafa [19]. The mathematical theory of the topological vertex is developed in [20].
- On the B-model side, we have the Holomorphic Anomaly Equations of Bershadsky, Cecotti, Ooguri, Vafa [9]. For the special case of toric CY3s the HAE are equivalent to the topological recursion of Eynard and Orantin. The use of TR for the computation of string amplitudes is first considered by Bouchard, Klemm, Mariño, Pasquetti in [21] and then proved by Eynard and Orantin in [22].
- There are other techniques, which are usually related to those mentioned above.

Mirror Symmetry One topic which was not covered is Mirror Symmetry. Some of the original ideas can be found in the old papers [23, 24]. Much more is added by Witten in [4, 5] and by Vafa in [25], where quantum cohomology is introduced more or less explicitly. The seminal papers which reviewed and gave a new and deep understanding of mirror symmetry are [26, 27, 28]. By now there are several books dealing with mirror symmetry and therefore covering all of the relevant topics mentioned above, most notably [29] and [30].

Other topics

- Open strings, ie open GW theory, the Fukaya category on the A-model side and the derived category of coherent sheaves on the B-model side. See, for example, [31] for an introduction. See [32, 33, 34, 35, 36, 37] for more details.
- Gauged Linear Sigma models (in math, FJRW theory [38]), see a recent survey [39] and references therein.
- Gopakumar-Vafa invariants [40, 41, 42], Donaldson-Thomas invariants [43, 44, 45, 46], knot invariants [47] and many other enumerative problems. See [48]. The list of applications in both physics and mathematics goes on and on: many refinements and deformations of these stories are possible.

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