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abstract	Let X be a complex four-dimensional compact Calabi-Yau manifold equipped with a K\"ahler form ω and a holomorphic four-form Ω. Under certain assumptions, we define Donaldson-Thomas type deformation invariants by studying the moduli space of the solutions of Donaldson-Thomas equations on the given Calabi-Yau manifold. We also study sheaves counting on local Calabi-Yau four-folds. We relate the sheaves countings over K_{Y} with the Donaldson-Thomas invariants for the associated compact three-fold Y. In some very special cases, we prove the DT/GW correspondence for X. Finally, we compute the Donaldson-Thomas invariants of certain Calabi-Yau four-folds when the moduli spaces are smooth.Comment: 103pages, author's Master thesis, comments are welcom	ä»¤X ç,ºå€‹å¸¶æœ‰å‡±å‹'å½¢å¼(KÃ¤hler form Ï‰) ä»¥åŠå…¨ç´”å››å½¢å¼(holomorphic four- form Î©)çš„å››ç¶ç·Šè‡´å¡æ‹‰æ¯”ä¸˜ç©ºé–"(Calabi-Yau manifolds) ã€‚åœ¨ä¸€äº›å‡è¨ä»¶ä¸‹ï¼Œéš€éŽç ”ç©¶Donaldson- Thomasæ–¹ç¨‹æ‰€æ±ºå®šçš„æ¨¡ç©ºé–"ï¼Œæˆ'å€'å®šç¾©äº†å››ç¶Donaldson-Thomasä¸è®Šé‡ã€‚æˆ'å€'ä¹Ÿå°å››ç¶å±€éƒ¨å¡æ‹‰æ¯"ä¸˜ç©ºé–"(local Calabi-Yau four-folds) å®šç¾©äº†å››ç¶Donaldson-Thomas ä¸è®Šé‡ï¼Œä¸¦ä¸"å°‡ä¹‹è¯ç¹«å°ˆä¸‰ç¶Fanoç©ºé–"çš„Donaldson- Thomas ä¸è®Šé‡ã€‚åœ¨ä¸€äº›æƒ…æ³ä¸‹ï¼Œæˆ'å€'é‚„ç ”ç©¶äº†DT/GWä¸è®Šé‡å°æ‡‰ã€‚æœ€å¾Œï¼Œæˆ'å€'åœ¨æ¨¡ç©ºé–"å…‰æ»'æ™‚è¨ˆç®—äº†ä¸€äº›å››ç¶Donaldson-Thomasä¸è®Šé‡ã€‚Let X be a complex four-dimensional compact Calabi-Yau manifold equipped with a Kahler form Ï‰ and a holomorphic four-form Î©. Under certain assumptions, we de ne Donaldson-Thomas type deformation invariants by studying the moduli space of the solutions of Donaldson-Thomas equations on the given Calabi-Yau manifold. We also study sheaves counting on local Calabi-Yau four-folds. We relate the sheaves countings over X = KY with the Donaldson- Thomas invariants for the associated compact three-fold Y . In some specialcases, we prove the DT/GW correspondence for X. Finally, we compute the Donaldson-Thomas invariants of certain Calabi-Yau four-folds when the moduli spaces are smooth.Detailed summary in vernacular field only.Cao, Yalong.Thesis (M.Phil.)--Chinese University of Hong Kong, 2013.Includes bibliographical references (leaves 100-105).Abstracts also in Chinese.Chapter 1 --- Introduction --- p.6Chapter 2 --- The *4 operator --- p.18Chapter 2.1 --- The *4 operator for bundles --- p.18Chapter 2.2 --- The *4 operator for general coherent sheaves --- p.20Chapter 3 --- Local Kuranishi structure of DTâ,,, moduli spaces --- p.22Chapter 4 --- Compactification of DTâ,,, moduli spaces --- p.34Chapter 4.1 --- Stable bundles compactification of DTâ,,, moduli spaces --- p.34Chapter 4.2 --- Attempted general compactification of DTâ,,, moduli spaces --- p.36Chapter 5 --- Virtual cycle construction --- p.39Chapter 5.1 --- Virtual cycle construction for DTâ,,, moduli spaces --- p.40Chapter 5.2 --- Virtual cycle construction for generalized DTâ,,, moduli spaces --- p.48Chapter 6 --- DT4 invariants for compactly supported sheaves on local CYâ,,, --- p.52Chapter 6.1 --- The case of X = KY --- p.52Chapter 6.2 --- The case of X = T*S --- p.57Chapter 7 --- DTâ,,, invariants on toric CYâ,,, via localization --- p.66Chapter 8 --- Computational examples --- p.70Chapter 8.1 --- DTâ,,,=GW correspondence in some special cases --- p.71Chapter 8.1.1 --- The case of Hol(X) = SU(4) --- p.72Chapter 8.1.2 --- The case of Hol(X) = Sp(2) --- p.77Chapter 8.2 --- Some remarks on cosection localizations for hyper-kÃ¤hler four-folds --- p.79Chapter 8.3 --- Li-Qin's examples --- p.80Chapter 8.4 --- Moduli space of ideal sheaves of one point --- p.83Chapter 9 --- Appendix --- p.85Chapter 9.1 --- Local Kuranishi models of McÂ° --- p.85Chapter 9.2 --- Some remarks on the orientability of the determinant line bundles on the (generalized) DTâ,,, moduli spaces --- p.87Chapter 9.3 --- Seidel-Thomas twists --- p.90Chapter 9.4 --- A quiver representation of Mc --- p.9
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