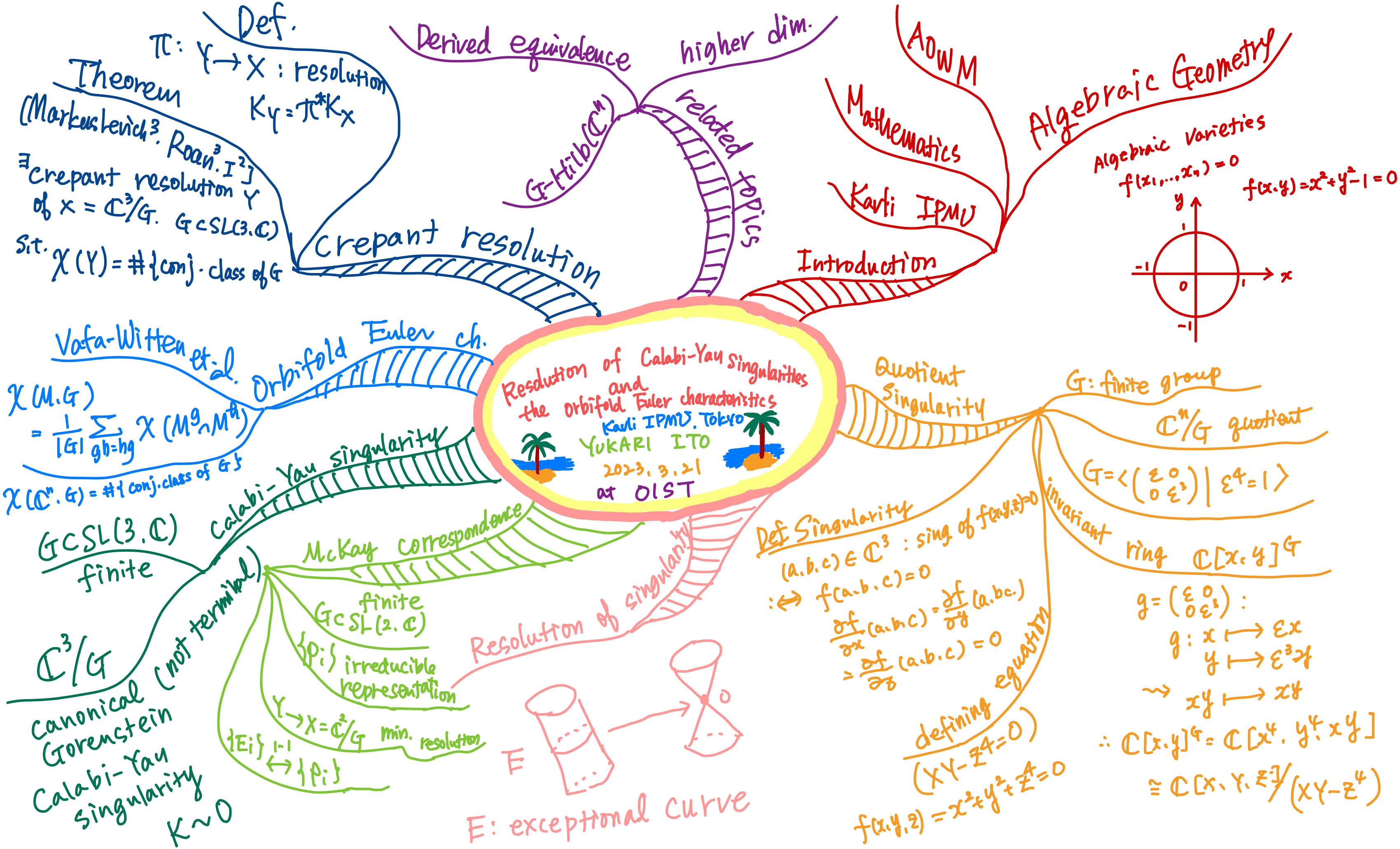

Resolution of Calabi-Yau singularities
and
the orbifold Euler characteristics
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at OIST
Introduction
Algebraic Geometry
Algebraic varieties
Algebraic f(x1,...,xn) = 0
f(x,y) = x²+y²−1 = 0
y
x
1
−1
0
1
−1
AOWM
Mathematics
Kavli IPMU
Derived equivalence
higher dim.
G-Hilb(Cⁿ)
related topics
Crepant resolution
Def.
π: Y → X : resolution
K_Y = π*K_X
Theorem
(Markushevich³, Roan³, I²)
∃ crepant resolution Y of X = C³/G, G⊂SL(3,C)
s.t. χ(Y) = #{conj. class of G}
Orbifold Euler ch.
Vafa-Witten et al.
χ(M,G) = 1/|G| Σ_{gh=hg} χ(M^g ∩ M^h)
= #{conj. class of G}
χ(Cⁿ, G) = #{conj. class of G}
Calabi-Yau singularity
G⊂SL(3,C) finite
C³/G
canonical (not terminal)
Gorenstein
Calabi-Yau singularity
K~0
McKay correspondence
finite G⊂SL(2,C)
{ρi} irreducible representation
Y→X=C²/G min. resolution
{Ei} 1-1 ↔ {ρi}
Resolution of singularity
E
0
E: exceptional curve
Quotient Singularity
G: finite group
Cⁿ/G quotient
G = ⟨(ε 0; 0 ε³) | ε⁴=1⟩
invariant ring C[x,y]^G
g = (ε 0; 0 ε³) :
g: x ⟼ εx
y ⟼ ε³y
⇝ xy ⟼ xy
∴ C[x,y]^G = C[x⁴, y⁴, xy]
≅ C[X,Y,Z]/(XY−Z⁴)
Def Singularity
(a,b,c) ∈ C³ : sing. of f(x,y,z)=0
:⟺ f(a,b,c)=0
∂f/∂x(a,b,c) = ∂f/∂y(a,b,c)
= ∂f/∂z(a,b,c) = 0
defining equation
(XY−Z⁴=0)
f(x,y,z) = x²+y²+z⁴=0