From now on, under the research title "Refinement of classical inequalities and application to its nonlinear elliptic equations", I will research focusing on the following subjects.

1. Measure value of "Kato's Inequality" up to the boundary concerns the quasilinear elliptic operator
2. Weighted Hardy' inequalities
3. Refinement of CNK type inequalities in weighted bounded variation function space

Subject 1 : Until now I have been studied Kato's inequality inside the boundary, from now on, I will study Kato's inequality on the boundary. In this study by the assertion of Brezis-Ponce (2008) (when p = 2), Δ u + (u + = max [0, u]) does not necessarily correspond to the bounded measure even if Δ u = 0. They considered the X class (if u is in the X class then u in W ^ {1,1} corresponds to a finite measure on C^1 space up to the boundary), Kato's inequality up to the boundary centering on that Δ u + has meaning. I would like to apply this result to the nonlinear cases as well.

Subject 2 : In this research I will extend the Hardy's inequalities in Brezis - Marcus (1997) to more general inequalities and I will also study the best constant of inequalities.

Subject 3 : The CKN type inequalities in this study are inequalities that classical weighted Hardy' inequalities and weighted Sobolev inequalities are unified.
All powers of distance from the origin are permitted as weight functions and classical inequality can be unified, using the new notion of "noncritical and critical" in the value of parameter. (c.f. [Mathematics, Vol. 68 No. 1 No. 1 January 2016 Winter issue], Toshiro Horiuchi).
When p> 1, the existence of a solution to realize the best constant, the continuity about the parameters of the best constant, the collapse of symmetry were systematically clarified. In the case of criticality, it is clarified that the right side becomes a different form of inequality including a logarithmic term. Based on these, I will study that inequalities with p = 1 in the critical case and the existence and symmetry collapse of the solution of the variational problem in the BV space (Bounded variation function space) with Professor Toshio Horiuchi of Ibaraki University. In particular, we want to elucidate quantitatively the range where collapse of symmetry occurs as much as possible. In particular, I want to elucidate the range of symmetry collapse quantitatively as much as possible. On the other hand, in the case of p> 1, since the linearization method was effective to some extent, research on this direction is going forward as well. In particular, analysis using BV space is still no much in the nonlinear case, we believe it will be a pioneer in this field.