RESEARCH STATEMENT

HIROAKI MINAMI

I'm interested in some structures on ω and cardinal invariants of the continuum related to these structure.

When we analyze the structure $(\omega)^\omega$ of infinite partitions of ω ordered by almost coarser $\sqsubset^*$, we can define cardinal invariants which is analogous to cardinal invariants on $([\omega]^\omega, \subset^*)$. We call the independence number for $(\omega)^\omega$ dual-independence number, denoted by $\mathfrak{i}_d$. As almost disjoint number $\mathfrak{a}$, we can show that if ZFC with measurable cardinal is consistent, then ZFC with $\mathfrak{u} < \mathfrak{i}_d$ is consistent. I conjecture that $\mathsf{cf}(\mathfrak{i}_d) = \omega$ is consistent as is $\mathsf{cf}(\mathfrak{a}) = \omega$.

Also I'm interested in mad families on ω, ideals on ω and relation among them. When we study those, Mathias-Prikry and Laver-Prikry type forcing are significant. Michael Hrušák and I prove that $\mathbb{M}(\mathcal{I}^*)$ adds a dominating real if and only if $\mathcal{I}^{<\omega}$ is P^+-ideal. Concerning to this results, it is known that $\mathfrak{b} = \mathfrak{c}$ implies that there exists a mad family such that $\mathbb{M}(\mathcal{I}(\mathcal{A})^*)$ adds a dominating real [1], where $\mathcal{I}(\mathcal{A})$ is ideal generated by $\mathcal{A}$. It is not known whether ZFC implies that there exists a mad family $\mathcal{A}$ such that $\mathbb{M}(\mathcal{I}(\mathcal{A})^*)$ adds a dominating real.

For ultrafilter, it is known that $\mathfrak{d} = \mathfrak{c}$ implies that there exists an ultrafilter $\mathcal{U}$ such that $\mathbb{M}(\mathcal{U})$ doesn't add dominating real [2]. I'm trying to know when we can construct such a mad family and such an ultrafilter by using our characterization.

References

[1] Jörg Brendle, *Mob families and mad families*, Archive for Mathematical Logic, 37, (1998), 183–197.

[2] R. Michael Canjar, *Mathias forcing which does not add dominating reals*, 10r, No 4, December (1998), 1239–1248.

[3] Michael Hrušák and Hiroaki Minami, *Mathias forcing and Laver forcing associated with ideals*, preprint.

Kurt Gödel Research Center for Mathematical Logic Währinger Strasse 25 A-1090 Wien Austria

E-mail address: minami@kurt.scitec.kobe-u.ac.jp