Oral Qualifying Exam Syllabus

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Major Topic: Control Theory

Linear systems in discrete and continuous time.
Minimum-norm control of time-varying linear systems.
Sufficient accessibility rank condition.
Feedback stabilization of LTI systems. Pole-shifting.
Unstable and stable modes.
Control-Lyapunov functions for LTI systems.
Realization theory for linear systems.
Observers and detectability. Dynamic feedback.
Continuous-time dynamic programming, Hamilton-Jacobi-Bellman equation.
Optimal control of LQ systems.
Optimal control using the Maximum Principle.

Minor Topic: Asymptotics

Perturbation methods, asymptotic matching.
Boundary layer theory.
Elementary WKB theory.