

# On resonance and the Landesman-Lazer condition for some Fully Nonlinear Elliptic equations

Alexander Quaas

Universidad Técnica Federico Santa María  
(joint work with P. Felmer and B. Sirakov)

We obtain different type of existence results and qualitative properties of the Dirichlet problem

$$\begin{aligned} F(D^2u, Du, u, x) + \lambda u &= f(x, u) && \text{in } \Omega, \\ u &= 0 && \text{on } \Omega, \end{aligned} \tag{0.1}$$

where the second order differential operator  $F$  is of Hamilton-Jacobi-Bellman type, that is,

$$F(D^2u, Du, u, x) = \sup_{\alpha \in \mathcal{A}} \{ \text{tr}(A^\alpha(x)D^2u) + b^\alpha(x) \cdot Du + c^\alpha(x)u \},$$

assuming that  $A^\alpha(x)$ ,  $b^\alpha(x)$  and  $c^\alpha(x)$  are continuous and that, for some constants  $0 < \gamma \leq \Gamma$ , we have:

$$\gamma I \leq A^\alpha(x) \leq \Gamma I,$$

for all  $x \in \Omega$ .