

Marie Fran oise BIDAUT-VERON  
Universit  de Tours, France

veronmf@univ-tours.fr

## Quasilinear elliptic equations with source terms involving the function or its gradient

in collaboration with Haydar ABDELHAMID

### Abstract

Here we consider a quasilinear equation of the form

$$\begin{cases} -\Delta_p v = \lambda f(x)(1 + g(v))^{p-1} & \text{in } \Omega, \\ v = 0 & \text{on } \partial\Omega, \end{cases} \quad (1)$$

where  $p > 1$ ,  $f > 0$ ,  $\lambda > 0$ , and  $g$  is nondecreasing,  $g(0) = 0$ . We show a precise link with a second problem presenting a source gradient term with a natural growth:

$$\begin{cases} -\Delta_p u = \beta(u) |\nabla u|^p + \lambda f(x) & \text{in } \Omega, \\ u = 0 & \text{on } \partial\Omega, \end{cases} \quad (2)$$

where  $\beta(u) \geq 0$ , defined on an interval of  $\mathbb{R}$ . We deduce new results of existence and multiplicity concerning the two problems, and the existence of extremal solutions, in particular when  $g$  is convex and  $\lim_{t \rightarrow \infty} g(t)/t = \infty$ .