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Entropy methods for degenerate drift-diffusion equations

I will present selected results from recent joint work with Jean Dolbeault, Philippe Bartier and Michal Kowalczyk. Linear drift-diffusion equations with degenerate or time-dependent coefficients arise in various applications, for example in traffic flow models or in flashing ratchet models. In more difficult (yet practically relevant) cases the coefficients may be coupled to moments of the dependent variable, producing a nonlinear problem. Entropy-entropy production estimates offer natural ways to describe the asymptotic behaviour of solutions to such problems, and I will show some of the relevant estimates.