

# COLÓQUIO DE MATEMÁTICA

Quarta-feira, 24 de novembro de 2021 às 16h00

## A Variational Approach to some Phase Transition Problems

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*Convívio antes do Colóquio na sala dos docentes do C6,  
com café, chá e bolos (15h45 até às 16h00)*

**Sumário:**  
In many situations, stable configurations of a physical system correspond to minima of its total energy, usually expressed as an integral of a certain energy density. Thus, the central problem of the Calculus of Variations is to minimise integral functionals, often under some constraints and/or boundary conditions.  
In this talk, I will explain the main ideas of the direct methods of the Calculus of Variations and show how some notion of convexity is related to the existence of solutions of the minimisation problem.  
I will then discuss some applications to the case of phase transitions.  
In this setting, the mathematical formulation of the problem leads to infinitely many solutions.  
In order to select the one that is physically relevant, we consider models that penalise the formation of interfaces between the phases.