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Optimum survival strategies against zombie infestations - a population dynamics approach[1] BRUNO MOTA, IF - UFRJ — We model a zombie infestation by three coupled ODEs that jointly describe the time evolution of three populations: regular humans, zombies, and survivors (humans that have survived at least one zombie encounter). This can be generalized to take into account more levels of expertise and/or skill degradation. We compute the fixed points, and stability thereof, that correspond to one of three possible outcomes: human extinction, zombie extermination or, if one allows for a human non-zero birth-rate, co-habitation. We obtain analytically the optimum strategy for humans in terms of the model's parameters (essentially, whether to flee and hide, or fight). Zombies notwithstanding, this can also be seen as a toy model for infections of immune system cells, such as CD4+ T cells in AIDS, and macrophages in tuberculosis, whereby cells are both the target of infection, and mediate the acquired immunity response against the same infection.

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