

# ON BRENNAN-SCHWARTZ PROCESS, THE HEAT TRANSFER EQUATION AND THE DENSITY OF AVERAGED GEOMETRIC BROWNIAN MOTION

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ABSTRACT. In this talk we explore the existing relationship between Brennan-Schwartz processes  $X$ :

$$dX_t = (\beta + \alpha X_t)dt + \sigma X_t dB_t, \quad X_0 = 0,$$

(which appeared in the the literature of interest rates) the heat transfer equation  $w$  in a moving medium with velocity of motion  $f$ :

$$\frac{\partial w}{\partial s}(s, y) = a \frac{\partial^2 w}{\partial y^2}(s, y) + f(y) \frac{\partial w}{\partial y}(s, y)$$

and the density  $\varphi_Y$  of averaged geometric Brownian  $P$  motion:

$$Y_t := \int_0^t P_s ds.$$

The study of such density is crucial in the computation of for instance: Asian options, and has recently resurfaced in the study of optimal execution strategies.