

# INTEREST RATES MODELS

## Homework assignment #6

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### Problems

1. Consider the following generalization of the constant hazard rate model:

$$\lambda(t) = \lambda\gamma(\lambda t)^{\gamma-1},$$

where  $\lambda, \gamma > 0$  are constant.

$$P = e^{-\int_0^t \lambda(s) ds}$$

- (i) Why is model (1) inadequate for prepayment modeling?
- (ii) Derive an explicit formula for the survival probability in this model.
- (iii) Assuming that the instantaneous discount rate  $r$  is constant, write down the expression for the valuation of a TBA.

2. Consider another parametric hazard model:

$$\lambda(t) = \frac{\lambda\gamma(\lambda t)^{\gamma-1}}{1 + (\lambda t)^\gamma}, \quad (2)$$

where  $\lambda, \gamma > 0$  are constant. Answer questions (i) - (iii) of Problem 1 (regarding model (2)), as well as the following question:

- (iv) If you were forced to choose between models (1) and (2) as the hazard rate in a prepayment model, how would you choose? Justify the answer.

**This assignment is due on May 14.**