

6. (4 Points.) Consider the system

$$\mathbf{x}' = \begin{pmatrix} 1 & 2 \\ 2 & 1 \end{pmatrix} \mathbf{x} + \begin{pmatrix} g(t) \\ 0 \end{pmatrix}, \quad \mathbf{x}(t) = \begin{pmatrix} x(t) \\ y(t) \end{pmatrix},$$

and assume that  $x(t)$  and  $y(t)$  satisfy the initial conditions  $x(0) = 0$  and  $y(0) = 1$ . Let  $g(t)$  be a function having a Laplace transform denoted  $G(s)$ , for  $s$  large enough. Find  $X(s) = \mathcal{L}\{x(t)\}$  and  $Y(s) = \mathcal{L}\{y(t)\}$  in terms of  $G(s)$ . Your answers should be in terms of  $s$ .

