1. Show that following quadratic form is positive definite using Sylvester’s criterion

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1. Check whether given following scalar functions are positive definite, positive semi definite, negative definite, negative semi definite or indefinite.

Answer: pdf, psdf, ndf, indefinite function, pdf.

1. Find the optimum value of the function
2. Consider following system

Determine the optimal control law such that P.I.

is minimized

Hint:

* Above system can be written as
* P.I. can be written in standard form
* Comparing above equation with following standard equation
* **Check controllability condition**
* For Control law Solve Algebraic Riccati Equation
* Controller gain
* Control law