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1. Assume that GNP, money demand (M2) and the interest rate (IR) are related as in the following VAR(2) model

$$
\begin{bmatrix} GNP_t \\ M2_t \\ IR_t \end{bmatrix} = \begin{bmatrix} 2 \\ 1 \\ 0 \end{bmatrix} + \begin{bmatrix} .7 & .1 & 0 \\ 0 & .4 & .1 \\ .9 & 0 & .8 \end{bmatrix} \begin{bmatrix} GNP_{t-1} \\ M2_{t-1} \\ IR_{t-1} \end{bmatrix} + \begin{bmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ .5 & 0 & 1 \end{bmatrix} \begin{bmatrix} u_{1t} \\ u_{2t} \\ u_{3t} \end{bmatrix}
$$

Plot (or write down) the values for t-1,2,3 for the impulse response functions for GDP, M2, IR following a unity shock $u_{1t} = 1$.

2. Write down the estimated variance in for GMM when the optimal weighting matrix is used. And when an arbitrary W matrix is used.

3. Explain why we can estimate the slope in a panel data model model by subtracting individual-specific means. (Use Frisch-Waugh [explain what that is] and orthogonality of regressors.)

4. In the Markov chain, using the notation of the book, prove that

$$
\pi'_{t+1} = \pi'_t P \; .
$$

Make sure to explain in detail what these symbols mean.

5. Write down the Bellman equation. Explain the definition of all terms.