2.30

$$\mathbb{E}[\mathbf{z}] = \mathbf{R}^{-1} \begin{pmatrix} \boldsymbol{\Lambda}\boldsymbol{\mu} - \mathbf{A}^T\mathbf{L}\mathbf{b} \\ \mathbf{L}\mathbf{b} \end{pmatrix}$$

$$= \begin{pmatrix} \boldsymbol{\Lambda}^{-1} & \boldsymbol{\Lambda}^{-1}\mathbf{A}^T \\ \mathbf{A}\boldsymbol{\Lambda}^{-1} & \mathbf{L}^{-1} + \mathbf{A}\boldsymbol{\Lambda}^{-1}\mathbf{A}^T \end{pmatrix} \begin{pmatrix} \boldsymbol{\Lambda}\boldsymbol{\mu} - \mathbf{A}^T\mathbf{L}\mathbf{b} \\ \mathbf{L}\mathbf{b} \end{pmatrix}$$

$$= \begin{pmatrix} \boldsymbol{\Lambda}^{-1}(\boldsymbol{\Lambda}\boldsymbol{\mu} - \mathbf{A}^T\mathbf{L}\mathbf{b}) + \boldsymbol{\Lambda}^{-1}\mathbf{A}^T\mathbf{L}\mathbf{b} \\ \mathbf{A}\boldsymbol{\Lambda}^{-1}(\boldsymbol{\Lambda}\boldsymbol{\mu} - \mathbf{A}^T\mathbf{L}\mathbf{b}) + (\mathbf{L}^{-1} + \mathbf{A}\boldsymbol{\Lambda}^{-1}\mathbf{A}^T)\mathbf{L}\mathbf{b} \end{pmatrix}$$

$$= \begin{pmatrix} \boldsymbol{\Lambda}^{-1}\boldsymbol{\Lambda}\boldsymbol{\mu} - \boldsymbol{\Lambda}^{-1}\mathbf{A}^T\mathbf{L}\mathbf{b} + \boldsymbol{\Lambda}^{-1}\mathbf{A}^T\mathbf{L}\mathbf{b} \\ \mathbf{A}\boldsymbol{\Lambda}^{-1}\boldsymbol{\Lambda}\boldsymbol{\mu} - \mathbf{A}\boldsymbol{\Lambda}^{-1}\mathbf{A}^T\mathbf{L}\mathbf{b} + \mathbf{L}^{-1}\mathbf{L}\mathbf{b} + \mathbf{A}\boldsymbol{\Lambda}^{-1}\mathbf{A}^T\mathbf{L}\mathbf{b} \end{pmatrix}$$

$$= \begin{pmatrix} \boldsymbol{\mu} \\ \mathbf{A}\boldsymbol{\Lambda}^{-1}\boldsymbol{\Lambda}\boldsymbol{\mu} + \mathbf{L}^{-1}\mathbf{L}\mathbf{b} \end{pmatrix}$$

$$= \begin{pmatrix} \boldsymbol{\mu} \\ \mathbf{A}\boldsymbol{\mu} + \mathbf{b} \end{pmatrix}$$

which is the same as in 2.108.