$\Phi(\Phi^T\Phi)^{-1}\Phi^T(R + \gamma P^\pi \Phi \omega^\pi) = \Phi\omega^\pi$, Φ lin. indep $\implies \Phi^{-1}$ exists
$\implies \Phi^{-1}\Phi(\Phi^T\Phi)^{-1}\Phi^T(R + \gamma P^\pi \Phi \omega^\pi) = \Phi^{-1}\Phi\omega^\pi$
$\implies (\Phi^T\Phi)^{-1}\Phi^T(R + \gamma P^\pi \Phi \omega^\pi) = \omega^\pi$
$\implies (\Phi^T\Phi)(\Phi^T\Phi)^{-1}\Phi^T(R + \gamma P^\pi \Phi \omega^\pi) = (\Phi^T\Phi)\omega^\pi$
$\implies \Phi^T(R + \gamma P^\pi \Phi \omega^\pi) = (\Phi^T\Phi)\omega^\pi$
$\implies \Phi^T R + \Phi^T \gamma P^\pi \Phi \omega^\pi = (\Phi^T\Phi)\omega^\pi$
$\implies \Phi^T R = \Phi^T\Phi\omega^\pi - \Phi^T\gamma P^\pi \Phi \omega^\pi$
$\implies \Phi^T R = (\Phi^T\Phi - \Phi^T\gamma P^\pi \Phi)\omega^\pi$
$\implies \Phi^T R = (\Phi^T(\Phi - \gamma P^\pi \Phi))\omega^\pi$
$\implies (\Phi^T(\Phi - \gamma P^\pi \Phi))^{-1}\Phi^T R = \omega^\pi$