We have a system of N fermions, $N^{\uparrow}$ being spin up, and $N^{\downarrow}$ being spin down:

$$\underbrace{x_1, \ldots, x_{N^{\uparrow}}}_{\text{Up spin}}, \underbrace{x_{N^{\uparrow}+1}, \ldots, x_N}_{\text{Down spins}}$$

We can construct $\Phi^{\uparrow}$ and $\Phi^{\downarrow}$:

$$\Phi^{\uparrow}(x_1, \ldots x_N) = \frac{1}{\sqrt{N!}} \begin{vmatrix} \phi_1(x_1, \overbrace{\underbrace{x_2, \ldots x_{N^{\uparrow}}}_{\text{Symmetric}}, \ldots x_N}^{\text{Remaining coordinates}}) & \phi_1(x_2, \underbrace{x_1, x_3, \ldots x_{N^{\uparrow}}}_{\text{Symmetric}}, \ldots x_N) & \cdots \\ \phi_2(x_1, \underbrace{x_2, \ldots x_{N^{\uparrow}}}_{\text{Symmetric}}, \ldots x_N) & \phi_2(x_2, \underbrace{x_1, x_3, \ldots, x_{N^{\uparrow}}}_{\text{Symmetric}}, \ldots x_N) & \\ \vdots & & \ddots \end{vmatrix}$$

Where $\Phi^{\downarrow}$ is constructed in the analogous way, using $N^{\downarrow}$ neural network functions, $\phi_{N^{\uparrow}+1}, \ldots, \phi_N$.

Our ansatz is

$$\Psi(x_1, \ldots x_N) = \underbrace{\Phi^{\uparrow}(x_1, \ldots x_N)}_{\text{Anti. } \uparrow} \underbrace{\Phi^{\downarrow}(x_1, \ldots x_N)}_{\text{Anti. } \downarrow} \underbrace{f(x_1, \ldots x_N)}_{\text{Symmetric}} e^{-\sum x_i^2}$$