4. $\dfrac{\partial}{\partial x}\left[f(x)\dfrac{\partial w}{\partial x}\right]+\dfrac{\partial}{\partial y}\left[g(y)\dfrac{\partial w}{\partial y}\right]=kw\ln w.$

Heat/mass transfer equation for inhomogeneous anisotropic media with volume reaction.

Multiplicative separable solution:

$$w(x,y)=\varphi(x)\psi(y),$$

where the functions $\varphi(x)$ and $\psi(y)$ are determined by the ordinary differential equations

$$[f(x)\varphi_x']_x'=k\varphi\ln\varphi+C\varphi,\qquad [g(y)\psi_y']_y'=k\psi\ln\psi-C\psi,$$

and C is an arbitrary constant.

References

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