

Integral recurrence relation

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I have encountered the following integral in some research in the physical sciences

$$\int |u-A|^{2a} |u-B|^{2b} \text{Exp}[-|u|^2] du$$

where u , A and B are cartesian vectors in 3 dimensions and the integral is to be performed over all space. This seems like quite a straightforward integral but the best I can do is to write it as a triple infinite series in A^2 , B^2 and $|A-B|^2$ (which quickly truncates, depending on the values of a and b). I was wondering if anyone has any suggestions as how I might produce a more useful formulation.

Even more useful would be a suggestion as to how I might derive a recurrence relation to generate integrals of higher values of a and b or if it is possible to prove or disprove the existence of such a relation.

Thanks in advance,

Darragh