

In the name of God

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CRITICAL PHENOMENA

Exercise Set 8

(Due Date: 1401/10/10)

1. Position space RG:
A: Exercise 6.2 of Statistical physics of fields written by M. Kardar.
B: Exercise 6.3 of Statistical physics of fields written by M. Kardar.
2. Widom scaling hypothesis: Exercise 4.1 of Statistical physics of fields written by M. Kardar.
3. Exercises no. 14.1, 14.2 of Statistical Mechanics written by Pathria and Beale.
4. Exercises no. 9.1, 9.2 and 9.3 of Goldenfeld.
5. If in a RG transformation, the recursive equation is given by:

$$\frac{d}{d\ell} \begin{pmatrix} u \\ v \end{pmatrix} = \begin{pmatrix} \epsilon - 4(d+8)u & -24u \\ -48v & \epsilon - 36v \end{pmatrix} \begin{pmatrix} u \\ v \end{pmatrix}$$

here $\epsilon \equiv 4 - d$

A: Find all fixed points in the plane (u, v) .

B: Draw the flow patterns for $d < 4$ and $d > 4$. Explain your results.

Good luck, Movahed
