

In the name of God

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ADVANCED TOPICS IN STATISTICAL PHYSICS II

Exercise Set 7

(Date Due: 1394/03/10)

1. Using Ito's and Stratonovich's definitions show that:

$$D_I^{(1)} = h(v, t)$$

$$D_I^{(2)} = g^2(v, t)$$

$$D_S^{(1)} = h(v, t) + g'(v, t)g(v, t)$$

$$D_S^{(2)} = g(v, t)^2$$

Write non-linear Langevin equation for each approaches

2. Show that generalized drift coefficient transform as contravariant vector if we define:

$$\bar{D}^i \equiv D^i - \sqrt{Det} \frac{\partial}{\partial x^j} \frac{D^{ij}}{\sqrt{Det}}$$

3. Show that covariant derivative of probability current is scalar

$$\bar{S}_{;i}^i \equiv \sqrt{Det} \frac{\partial}{\partial x^i} \frac{\bar{S}^i}{\sqrt{Det}}$$

Good luck, Movahed
