# tf.contrib.distributions.assign_log_moving_mean_exp

```
assign_log_moving_mean_exp(
    log_mean_exp_var,
    log_value,
    decay,
    name=None
)
```

Defined in **tensorflow/contrib/distributions/python/ops/moving_stats.py** .

Compute the log of the exponentially weighted moving mean of the exp.

If `log_value` is a draw from a stationary random variable, this function approximates `log(E[exp(log_value)])` , i.e., a weighted log-sum-exp. More precisely, a `tf.Variable` , `log_mean_exp_var` , is updated by `log_value` using the following identity:

```
log_mean_exp_var =
= log(decay exp(log_mean_exp_var) + (1 - decay) exp(log_value))
= log(exp(log_mean_exp_var + log(decay)) + exp(log_value + log1p(-decay)))
= log_mean_exp_var
  + log(  exp(log_mean_exp_var   - log_mean_exp_var + log(decay))
       + exp(log_value - log_mean_exp_var + log1p(-decay)))
= log_mean_exp_var
  + log_sum_exp([log(decay), log_value - log_mean_exp_var + log1p(-decay)]).
```

In addition to numerical stability, this formulation is advantageous because `log_mean_exp_var` can be updated in a lock-free manner, i.e., using `assign_add` . (Note: the updates are not thread-safe; it's just that the update to the tf.Variable is presumed efficient due to being lock-free.)

## Args:

- `log_mean_exp_var` : `float` -like `Variable` representing the log of the exponentially weighted moving mean of the exp. Same shape as `log_value` .
- `log_value` : `float` -like `Tensor` representing a new (streaming) observation. Same shape as `log_mean_exp_var` .
- `decay` : A `float` -like `Tensor` . The moving mean decay. Typically close to `1.` , e.g., `0.999` .
- `name` : Optional name of the returned operation.

## Returns:

- `log_mean_exp_var` : A reference to the input 'Variable' tensor with the `log_value` -updated log of the exponentially weighted moving mean of exp.

## Raises:

- `TypeError` : if `log_mean_exp_var` does not have float type `dtype` .
- `TypeError` : if `log_mean_exp_var` , `log_value` , `decay` have different `base_dtype` .

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