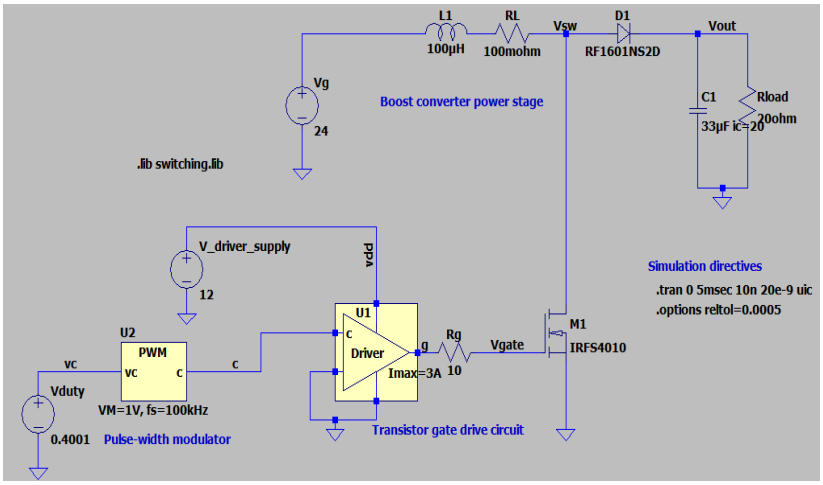
Week 1

Steps to execute before running Boost example

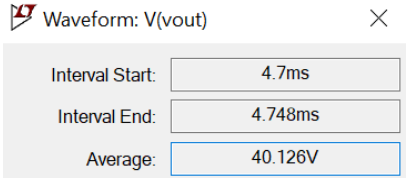
Simulation stops at 640microsec

Edit duty cycle to 0.4001

Introduction to Power Electronics

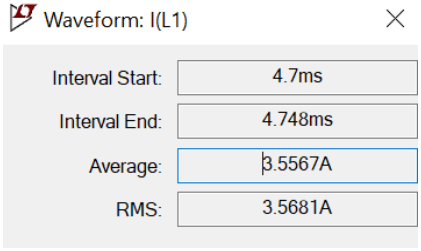


What is the steady-state average output voltage (expressed in volts)?




```
Vout = 40.126;
```

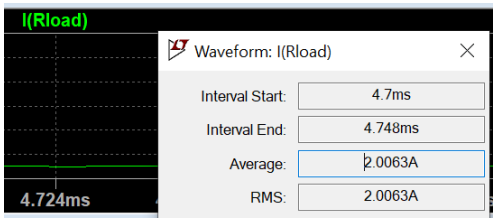
What is the steady-state average inductor current (in amps)?




```
iL = 3.55;
```

What is the steady-state output power (in watts)?

Pout = I(Rload) * V(vout)




```
iR = 2.0063;
Pout = iR*Vout
```

```
Pout = 80.5048
```

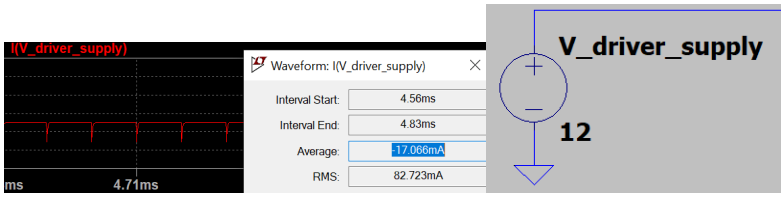
What is the average power drawn out of the input source Vg during steady-state operation of the converter (in watts)?

Pin = Vg* iL

```
Vg = 24;
Pin = Vg*iL
```

```
Pin = 85.2000
```

What is the average power consumption of the gate driver (in watts)?




```
idriver = 17.066e-3;
% Probe is in negative direction.
Vdd = 12;
Pgatedriver = idriver*Vdd
```

```
Pgatedriver = 0.2048
```

What is the converter efficiency (enter a numeric value between 0 and 1)?

```
eff= Pout/Pin
```

```
eff = 0.9449
```

```
% According to grader;eff = 0.946-0.948
```

Now change the control voltage input to the pulse-width modulator, so that it produces a control signal having a duty cycle of 0.6. Run the simulation again. What is the new steady-state average output voltage?

ans = 60