A comment on Tang Academy

As this is longer than I imagined, I'll mention that the first part (parts are separated by line breaks) is just context needed for people starting off in physics competitions. The second part are the good parts of Tang Academy while the third part are the bad parts. If you don't want to read everything, a good summary is given in the last part.

I think most people who've done competitive physics have heard of Tang Academy at some point. Unlike math competitions, physics competitions don't have as many courses or programs for one to sign up for. It's this lack of programs that makes Tang Academy a "magnet" for people who want to excel beyond the usual AP Physics C or F=ma exam level. I've heard many differing opinions on Tang Academy from something along the lines of "it's the best program ever since there are 5 campers a year from it" to "it's a waste of money for its egregiously high price point". As someone who's taken 3 of the 5 courses he's offered and also made the U.S. Physics Team, I feel like there's more to the story than a black and white analysis.

To start, I feel like there's some important context to be had, especially if you're just starting off in physics (which is the primary audience of Tang Academy and this commentary). Unlike math competitions, physics competitions don't have an "AoPS platform" or numerous programs or courses. Thus, most learn from textbooks such as HRK or Problems and Solutions in Introductory Mechanics. However, some people don't learn very well from textbooks (a trend especially for younger students in middle school), so they turn to programs or courses. I feel like it's these people that really benefit from Tang Academy despite the high price tag.

As some more context, his classes run as pretty much any other preparation program would. Depending on the class, there are around 2 hours a week of zoom meetings where he explains concepts like conservation of energy and momentum. There's also a "quiz" every week, but it's not graded. Then, he assigns around 7 homework problems and asks you to review/correct your quiz. His classes cost a couple thousand USD for the whole course (which lasts around 8 months depending on which one you take). He also responds to emails pretty regularly if you have any questions. So far, it's been a pretty objective description of how the program runs and why people take it, so now I'll talk about my own opinions.

I'll start off by highlighting some positive aspects of Tang Academy and where the high praise and allure comes from. I think the main reason there's so much attraction is simply that it **forces you to do physics**. I've heard so many people say they're "going to read HRK and do 10 problems per chapter per week" or something along those lines, but they never get to it. Out of 100 people who say they're going to try physics competitions, only 10 actually open a textbook, and only 1 of those 10 finish the textbook. Obviously those numbers aren't accurate, but the idea still holds. Tang Academy is really useful in the sense that he forces you to be accountable with deadlines and quizzes.

Another aspect is that you can directly ask questions about any confusions. Physics is a subject built on intuition and subtlety, so you'll inevitably have questions. Having someone to ask those questions to is extremely useful in avoiding headaches. To counter this, people say that "you can ask online instead and not pay the hefty course fee". While this is true, you're also risking getting a dubious or incorrect answer (although this depends where you ask the question).

I think the other obvious "benefit" is that you actually have someone talking to you and instilling the concepts. This is obviously beneficial to some more than others and the degree definitely depends person to person. In my opinion, Tang lectures decently well, but it could be boring to some. Lastly, he also curates the problems he chooses as homework and quizzes, so they end up being well-posed and somewhat interesting (for the skill level). People doing HRK are usually scared by the sheer number of problems (and some being poorly worded or not useful for exam preparation) which I think is an issue that Tang decently resolves.

In comparison, I feel like there are a decent number of flaws/**alternatives to Tang Academy**. First and foremost, resources such as Kevin Zhou's handouts, Morin's textbooks, Wang and Ricardo, etc. are more insightful and contain more physics knowledge/ideas needed for competitions. At face value, these resources are "better" in the sense that they have more and deeper physics but, as I mentioned before, most are scared to start with these due to their length.

Tang's AP Phys. C EM and F=ma exam courses cover pretty much everything needed for the respective exams at a good depth. However, his USAPhO course suffers greatly from the issues above. With the USAPhO exam, the scope is so much larger with EM, Relativity, Thermodynamics, etc. that his coverage (which is only 3-4 weeks for Thermo and 2 for Relativity for instance) is not nearly enough. I'd personally be very surprised if anyone could learn these topics without having to read a supplementary textbook or handouts (which I did when I took the course). Topics such as wave optics are also only briefly covered compared to the 3 chapters that HRK dedicates to it.

In contrast, resources such as Kevin Zhou's handouts cover each topic a lot more deeply with around 30 problems per handout (and 7 handouts for Mech. and EM, 3 for Thermo, and 2 for Relativity). I won't go into much detail on his handouts (check his website), but they are essential for anyone wanting to make the U.S. Physics Team. I personally did these handouts in parallel with Tang Academy when I took it.

Lastly, I think an obvious "issue" is the high price tag of a couple thousand dollars per course. The price per hour (of zoom meetings) comes down to around 30-40 USD (when I took it) which, as preparation programs go, isn't that bad, but can also be out of reach for people. Most people's complaint with price comes with the fact that there are so many cheaper and free resources to learn physics (as mentioned above) that Tang Academy seems steep in comparison.

In my opinion, if you're looking to start off with physics, Tang Academy is a good idea to learn F=ma exam level mechanics or basic EM. It helps take the scary aspect of a thick textbook (which most people tend to dislike at first) away from learning physics while still providing a

good enough coverage from the exams. However, I feel like, when you get to a higher level (i.e. amining to get a gold or above on USAPhO), Tang Academy, while useful, is really not as good as some other options (namely Kevin Zhou handouts and Morin textbooks).

The more grey area is if you're just starting to learn USAPhO topics (Waves, Thermo, Relativity, etc.). Tang can be a good option as it helps make the 30+ chapters of HRK more digestible and approachable. However, the coverage given is nowhere near enough to become proficient in those topics for the USAPhO exam and will, at most, get you a silver medal (depending on your EM and Mech. knowledge). At this level, I would personally recommend trying to read HRK or higher level books (such as Blundell and Blundell's Thermo book) as you'll need that skill eventually when you aim for a higher USAPhO medal, but I totally understand people who are initially hesitant to read 30+ chapters. Also, at this level, it's easy to get discouraged/stop doing physics due to the large load, and Tang can help force you to do physics if you lack the motivation.

As you can see, there's a decent amount of grey area (in my opinion) on the usefulness of Tang Academy that I hope is now clearer to people wanting to learn physics.